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GOUT, RHEUMATISM AND INFECTION FROM HIPPOCRATES TO HENCH.[1]

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FOR 2500 years the story of arthritis seems to a superficial glance to be "a tale told by an idiot, full of sound and fury, signifying nothing". The great scientific advances of two centuries have left this field unchanged. Thomas Sydenham (1624-1689) is still an authority on diagnosis—and Sydenham had improved little on Hippocrates. Before 1949 the only advance in medication which had stood the test of time was the introduction of salicylates by a Scot named Maclagan in 1876.

Before 1700 there were no diseases; there was only disease, which was a disturbance of the harmonious mixture of the four humours—black bile, phlegm, yellow bile, blood. These were linked with the four elements—fire, earth, water, air—and with the four constitutions or temperaments—melancholic, phlegmatic, choleric and sanguine; and everything had to be either hot or cold, and also either moist or dry. Chaucer tells us that the physician in the "Canterbury Tales" was well versed in every medical book from Hippocrates to Gilbert, and

> He knew the cause of every malady
> Were it of hot or cold or moist or dry.

All this made a logical and unified system which had a ready explanation for every new fact, but admitted no new ideas. Hippocrates—or whoever wrote the so-called Hippocratic writings—himself refused to be limited in this fashion. In the opening sentence of his first book—"On Ancient Medicine"—he wrote (Adams, 1849):

> Whoever having undertaken to speak or write on medicine, have first laid down for themselves some hypothesis to their argument, such as hot, or cold, or moist, or dry, or whatever else they choose (thus reducing their subject within a narrow compass, and supposing only one or two original causes of diseases or of death among mankind) are all clearly mistaken in much that they say; and this is the more reprehensible in relating to an art which all men avail themselves of on the most important occasions, and the good operators and practitioners in which they hold in especial favour.

Despite the confusion in the rheumatic field, on looking back we can trace two coherent threads which seem to persist from start to finish as distinct ideas: the difference between gout and rheumatism, and the relation between arthritis and infection.

[1] Read at a meeting of the Section of Medical History of the Victorian Branch of the British Medical Association on June 11, 1956.

GOUT VERSUS RHEUMATISM.

To Hippocrates, gout and arthritis were different entities. He wrote as though he were expressing views which had always been accepted. Thus he said of the Scythians:

> Whenever men ride much and frequently on horseback, then many are affected with rheums in the joints, sciatica and gout, and they are inept at venery.

One of the aphorisms refers to arthritic diseases in general as occurring in dry seasons; while another aphorism states:

> Swellings and pains in the joints, without ulceration, those of a gouty nature, and sprains, are generally improved by a copious affusion of cold water.

The Hippocratic writings mostly refer to gout as podagra, a painful seizure in the foot; a painful seizure in the hand was cheiragra, in the knee gonagra, in the shoulder omagra (Garrod, 1859).

There were three general internal causes of chronic disease—indolence, intemperance and vexation—and it was overcome in general by exercise, temperance and tranquillity. The indigestion of the humours could be controlled in part by regulating eating and drinking, and by removing fluid through purging, douching, vomiting, bleeding, sweating, blistering. It was a strange medical hypocrisy which allowed the doctor to torture his patient in many ways, to depress him to the profoundest depths of gloom, and then to enjoin on him tranquillity of soul. There is little wonder that Corellius Rufus, the friend of Pliny the younger, took his own life because he could not bear any longer the tortures of the gout.

In the thirteenth century the word gout was used by a Frenchman called Radulfe (Garrod, 1859). *Gutta* is Latin for a drop; it was thought that the peccant humour was distilled into the joint drop by drop. Some people believe that the term originated in a semi-humorous understatement; they spoke of a drop of the humours as we speak of a drop of rain. One of the earlier documents which employed the term was addressed to the patient, a nobleman named John of Aix, who had been a magistrate in Metz in 1373 and died in 1398 (Saye, 1934). It was written by one John Le Fèvre, who could not have been a regular physician because he used a French dialect instead of the customary Latin.

To Sydenham and to Hippocrates disease in a choleric person was a different thing from the same symptoms in a phlegmatic, a sanguine or a melancholic one. Sydenham repeated many of the Hippocratic aphorisms; thus he said that gout was seen in women only after the menopause, and in young men only after sexual intercourse, that it did not occur in eunuchs, and so on. He condemned so many of the current remedies that he was reputed to be a therapeutic nihilist. Yet by today's standards he seems excessively credulous, as he recommended drugs by the dozen. He protested against the heroic and punishing systems of treatment which tortured many a patient. He quoted a letter from a friend, Dr. H. Paman: "To suffer at the hands of God is enough; no need that the physician torture him as well." Elsewhere he wrote:

> I confidently affirm that the greater part of those who are supposed to have died of gout have died of the medicine rather than of the disease—a statement in which I am supported by observations.

The idea of a gouty state involving viscera was suggested in the second century by Rufus of Ephesus (Moreno, 1955), but it was not generally accepted until the seventeenth century. Sydenham wrote that the dread of being cured of the gout was greater than the dread of having it. There arose a form of therapeutic self-deception; if the patient's gout was not relieved the doctor was able to say: "It is fortunate that you are not cured; it is better to leave the peccant humours in your toe than to drive them inwards." Pope, in the "Essay on Man", compared this hypocrisy with the moral evil of trying to justify our selfish acts:

> [We] from a judge turn pleader, to persuade
> The choice we make, or justify it made:
> Proud of an easy conquest all along
> We but remove weak passions for the strong:
> So, when small humours gather to a gout
> The doctor fancies he has driven them out.

Gout later came to be known as a peculiarly English disease—possibly because Sydenham, a sufferer himself, had written the classical description. The French believed that it was attributable to the enormous English consumption of beer. The British monopoly has been illustreated by a true story which also illustrates Osler's kindness of heart (Cushing, 1924). At dinner in London, Osler was discussing with a few admiring young men a recent book called "*Physiologie du goût*" (taste sensation). But one of them started to talk about gout, which in French is *goutte*. He became confused and embarrassed, when Osler sensed his difficulties and murmured:

> The French have taste in all they do
> Which we must do without
> For nature, which to them gave *goût*,
> To us gives only gout.

Gout was blamed later for a host of diseases, and we often read in history that a patient died when the gout ascended to his stomach or heart. William Pitt the elder used to have attacks of insanity which were euphemistically called gout in the brain (Graham, 1955). In 1859 Sir Alfred Garrod wrote:

> A careful perusal of the writings of some of the authors of the last and the commencement of the present century, must convince every thinking man that many of the forms of gout so elaborately described, especially by continental physicians, have no real existence in nature.

Yet Garrod himself went on to make a list of the effects of gout, which comprised a great variety of common ills, including cramp, neuralgia, paralyses, hysteria, epilepsy, and pains in the left side of the chest which resembled coronary occlusion.

In the eighteenth century Hoffman put forward the imaginative view that the gouty deposits in the joints were composed of tartar of wine (the sediment which cakes on the inside of the barrel). In 1776 Scheele discovered uric acid in the urine; and in 1797 Wollaston isolated it from a tophus (Rolleston, 1940). However, the importance of this discovery was not urged strongly until Garrod (1859) claimed that the evaporation of the sweat of a gouty patient left pure uric acid powder on the skin. He said that there was only a faint trace of uric acid in normal blood, whereas in the blood of a gouty patient it would crystallize on a thread. At this stage gout began to decline and rheumatism to increase in importance.

Rheumatism.

The history of rheumatism is different from the history of gout. Until the sixteenth century the term was not applied to disorders which were skeletal only. It was derived from the Greek ῥεῖν, to flow, and from the earliest times it was applied to anything which suggested a flow of humours from place to place, especially to diseases which were transient or which recurred, or to symptoms which spread from part to part. It was thought that phlegm, one of the four basic humours, was secreted by the pituitary gland (πίτυίτος = phlegm), and that a cold in the head signified excessive activity of the brain; the downward flow (καταρρέω = catarrh) of the humours resembled the outward flow of phlegm which caused swellings of the limbs.

The tenth century medical historian Richer of Rheims, who described with much detail the last illnesses of many distinguished Frenchmen, wrote that Ingo, the standard-bearer to the Court of France, had died in 893 from an excess of rheumatic humours, after a severe wound which had become gangrenous. He said: "Since the rheum was enclosed it swelled greatly, and with his entire body thus infected with erysipelas, he died." (Mackinney, 1934.)

These writings show how mistaken is the common view that Europe in the Dark Ages was sunk in medical ignorance. Sigerist (1934, 1941, 1943) and others have discovered many such documents, which show that the principles of Hippocrates and Galen were carried through

without a break. In England the Venerable Bede wrote that Cuthbert of Northumbria in the eighth century had cured with poultices a chronic swelling of the knee which had been causing a flexion deformity and preventing the patient from walking (Comrie, 1932).

The first writer to separate rheumatism from catarrh was the Frenchman Baillou, or Ballonius (Figure I),

FIGURE I.
From Ruhmann (1940).

whose "*Liber de rheumatismo*" (Figure II) was published in 1643, fifty years after his death (Ruhmann, 1940). On the title page it had the following *approbatio*, which illustrates the intellectual slavery which had lasted for two millennia (Irons, 1942).

> We, the undersigned Dean and doctors of medicine of the Paris Faculty, witness that we have seen and read accurately and diligently the several works of William Baillou, Doctor of Medicine of Paris, in which we find nothing contrary or repugnant to the doctrines of Hippocrates or Galen.
>
> De la Vigne, Dean
> John de Bourges
> Guy Patin (Censor Scholarum)
>
> July 7, 1643

Baillou wrote: "The method by which this affection attacks is falsely called catarrh (for the name catarrh signifies distillation from the head); it seems better to speak of it as rheumatism." He said also that the muscular and sinewy parts were flooded with serum and fevered blood, and that repeated attacks were liable to lead to chronic changes in the joints. Because the changes were chiefly articular, Baillou said that rheumatism was difficult to distinguish from gout:

> What gout is in any limb exactly so is rheumatism in the whole body. Both complaints are somewhat painful, but the gouty pain in the joint is repeated at definite times and periods. Not so this rheumatism, unless it be in those who have sinned in their manner of living . . . Those people who have had this rheumatism two or three times . . . can hardly escape the torment of gout, so that such a rheumatism is, as it were, a forerunner and pioneer of gout.

Thirty years later Thomas Sydenham insisted that rheumatism differed essentially from gout:

> Its violence may vary, so that, after the fashion of gout, it may come on at odd times in periodic fits . . . the pains may cease of their own accord . . . The patient, however, shall be a cripple to the day of his death, and wholly lose the use of his limbs, whilst the knuckles of his fingers shall become knotty and protuberant (as in gout) . . . It happens . . . frequently, that he will be troubled during the remainder of his life with wandering pains, sometimes mild, sometimes severe; . . . The pains come sometimes in one part, sometimes in another, they seldom occasion much suffering, seldom are attended with fevers . . . At times it afflicts this or that joint, at times the inward parts only . . . Thus it harasses the patient by turns, and prolongs itself to the duration of the most chronic amongst the chronic diseases.

After Sydenham we seldom hear of rheumatic disorders which are not skeletal. A century later John Haygarth (1805) said that exposure to cold or moisture was the main cause of acute rheumatism, and William Heberden (1803) wrote: "The rheumatism is a common name for many aches and pains which have yet got no peculiar appelation though owing to different causes." Literary men, however, kept their poetic licence to use the term in its older sense of a distillation from the brain. John Gifford described the utterances of his political opponents as "the ropy drivel of rheumatic brains".

Acute Rheumatism and Rheumatic Gout.

In 1837 John Bouillaud, of Paris, wrote his "New Researches on Articular Rheumatism", mostly about acute rheumatic fever, and chronic arthritis was barely mentioned. This book is an accepted classic, and in France today rheumatic fever is still called Bouillaud's disease. Doctors then abandoned the laymen's broad anatomical use of the word rheumatism, and in scientific medicine the term was appropriated by rheumatic fever (acute rheumatism), which was very common. The large group of non-gouty chronic arthritides were left without a name. Because they seemed to be half-way between gout and acute rheumatism they were often called rheumatic gout; but they were known by a host of other names—chronic articular arthritis, nodosity of the joints, nodular rheumatism, osteoarthritis. Until forty years ago rheumatoid arthritis and osteoarthritis were interchangeable terms.

Then Garrod (1859) condemned the term rheumatic gout. He said that rheumatism and gout should not be confused; gout always began in a single joint and had few constitutional symptoms, while rheumatism was polyarthritic from the start. He suggested rheumatoid arthritis for "an inflammatory affection of the joints, not unlike acute rheumatism in some of its characters, but differing materially from it".

Arthritis and Infection.

From the beginning, arthritis has often followed other diseases, especially infections. One of the Hippocratic aphorisms is as follows: "In cases attended with protracted fevers, tubercles or pains occur about the joints." In "Regimen in Acute Diseases" Hippocrates gives an indistinct description of polyarthritis spreading from the feet after a fever:

> When in fevers, abscesses form about the legs, . . . if the other symptoms are very favourable, expect in such a case that pains will fall upon the feet . . . and if these

> continue long in a very painful and inflamed state, if there be no resolution the pains will extend by degrees to the neck, to the clavicle, shoulder, breast, or to some articulation, in which an inflammatory tumour will necessarily form. When these are reduced, the hands are contracted, and become trembling.

Baillou said that many patients who contracted rheumatism had already been suffering from protracted illnesses; that ulcerative and inflammatory lassitude was closely related to rheumatism. To Sydenham and the later physicians acute rheumatism was a febrile disorder which was hard to differentiate from other fevers. Today 40% of cases of juvenile rheumatism follow infections of the throat; little wonder that the mediæval physicians failed to differentiate the naso-pharyngeal infection from the swelling of the joints—the rush of humours to the extremities—which followed the infection. And there was the additional difficulty of differentiating true bacterial infections of joints (almost extinct since the introduction of sulphonamides and penicillin) from acute rheumatism.

Chronic polyarthritis in 35% to 40% of cases follows precipitating events such as exposure, operation, injury, coronary occlusion, carcinoma of the lung, and infections of various kinds (tonsillitis, dysentery, meningitis, urethritis, brucellosis, tuberculosis). Some of these varieties have been given special names (Still's disease, Reiter's syndrome, Poncet's disease, psoriatic arthritis). In "The Tempest", Ariel was commanded by Prospero to afflict his enemies with a combination of arthritis with a papular rash:

> Go charge my goblins that they grind their joints
> With dry convulsions, shorten up their sinews
> With aged cramps, and more pinch-spotted make them
> Than pard or cat o' mountain.

There is no clinical evidence to suggest that the arthritides which follow these diseases differ fundamentally from those which are apparently idiopathic. Arthritis is a non-specific inflammation of articular tissues which in 60% of cases starts without any precipitating cause. Before the advent of sulphapyridine and the antibiotics it was thought that the joints were actually invaded by gonococci in gonococcal arthritis and by meningococci in meningococcal arthritis. Repeated failures to cultivate the organisms from the joints were attributed to errors of technique. Nowadays the infections are quickly suppressed by antibiotics, but the arthritic sequelæ do not subside any more rapidly than they did before. The inflammation in the joint is not due to direct infection, but to a delayed constitutional reaction.

Localized fibrositis, such as lumbago, may be precipitated by any infectious disease. This is probably the meaning of the Hippocratic saying: "In convalescents from disease, if any part be pained, there deposits are formed." Sydenham said: "I have seen a certain affection taking the appearance of rheumatism, and besides this, become not unlike pains in the kidneys, in respect at least to the severity of the suffering in the lumbar region. As this is wont to follow intermittent fevers, it may be due to a translation of the febrile matter to the muscular parts of the body."

When the poet wrote of

> The pangs arthritic that infest the toe
> Of libertine excess . . .,

he was not only making a moral judgement; he was probably recording the fact that arthritis followed urethral infection. The Hippocratic aphorism—gout occurs in young men only after sexual intercourse—no doubt refers to urethritic arthritis, which William Musgrave, of Exeter, first described in 1703 in a book called "*De arthritide symptomatica*" (Rolleston, 1940).

After the discovery of bacteria the germ theory was triumphant and the discovery of the causes of most diseases was confidently expected. This was true especially of rheumatism, which resembled many known bacterial diseases. Poynton and Paine in 1900 almost proved that juvenile rheumatism was due to a diplococcus. The argument continues, and many now think that the infecting organism is a streptococcus, though in adults it often follows injuries and non-streptococcal infections. But it was only a short step from acute rheumatism, the infectious disease, to chronic rheumatism, the effect of chronic or latent infection. When acute rheumatism which has followed tonsillitis is followed by recurrent milder attacks, it seems reasonable that the sequelæ may be due to the same infective agent, lurking in the tonsils and attenuated in virulence.

The Septic Focus.

Later the teeth were blamed, and William Hunter (1911), who died in 1937, was the persistent advocate of dental sepsis who stampeded the medical profession. Benjamin Rush (1809), who preceded him by more than a century, relieved a number of chronic diseases by removal of teeth; he did not claim to be first with the discovery:

> I have been made happy by discovering that I have only added to the observations of other physicians, in pointing out a connection between the extraction of decayed and diseased teeth and the cure of general diseases.

The theory of latent infection is tempting because it offers the patient and the doctor something which can be done. If removal of the tonsils or the teeth does not cure him, there still remain the appendix, the gall-bladder, the prostate, the nasal sinuses and other possible sources of infection. Sometimes an operation is followed by improvement which is a natural fluctuation. Once in every dozen cases, however, the immediate improvement is so dramatic that it must have been related to the operation.

When I once suffered from post-scarlatinal rheumatism, I had pain and stiffness in my shoulders, wrists and knees without any local tenderness; the under surfaces of my heels were so sore than I had to walk on my toes. I went to bed for two or three weeks, but the stiffness in my shoulders and knees did not decrease. Then my tonsils were taken out; to my amazement the next day I was completely free from pain or stiffness of any kind. My improvement was short-lived; on the following day the pains and stiffness were worse than ever.

If this improvement had persisted I should have been a lifelong adherent of the septic focus theory. Many writers have reported similar instances of relief of rheumatic symptoms after tonsillectomy, and indeed after a host of different operations. Hench (1949) collected a great number of them, and said that the only common factor was the general anæsthetic, which, he said, stirred the adrenal to secrete the antirheumatic factor. But I have known operations under local anæsthesia, and even infections such as influenza, to initiate a sudden amelioration.

The Disappearance and Rediscovery of Gout.

At the time when the infectious origin of rheumatism was accepted, gout was disappearing from the field. Garrod had written:

> The establishment of the fact that gouty inflammation is invariably accompanied with the deposition of a peculiar salt is of the highest importance, in as much as it proves the inflammation to have a specific character, and to differ entirely from the various other morbid affections of the joints with which it has hitherto been confounded.

The peculiar nature of the œdema was almost a diagnostic feature which, he said, amounted to a reaction around a foreign body. But he contradicted himself when he said also that uric acid could not be a true irritant, because most tophi grew for many years without causing inflammation. Garrod was so certain of his grounds that he refused to believe a French physician who described tophi composed only of phosphate of lime.

But it was not Garrod's contradictions and primitive biochemical methods which caused gout nearly to vanish; it was the theory of focal sepsis. Nearly every patient with articular troubles had teeth or tonsils or other foci. The urge to diagnose muscular rheumatism or rheumatoid arthritis was encouraged by the knowledge that a practical means of treatment was to hand. When I was a student I hardly saw a single case diagnosed as gout, although I heard of it in lectures as a disease of metabolism.

Twenty-three years ago Hench (1933) pointed out that acute old-fashioned gout was not uncommon and could be recognized in 2% of patients at any rheumatic clinic. It is almost confined to men aged over thirty-five years and starts in the great toe. Hench pointed out that though it is a disease of uric acid metabolism, the blood uric acid level is raised in only half of the cases. Hench *et alii* (1938) gave 20 diagnostic criteria, 19 of which occur sometimes with rheumatic arthritis too; the only pathognomonic sign is the tophus, which appears in less than half of the cases—sometimes not for fifteen years. In recent years the tophus, too, has been losing its diagnostic certitude;

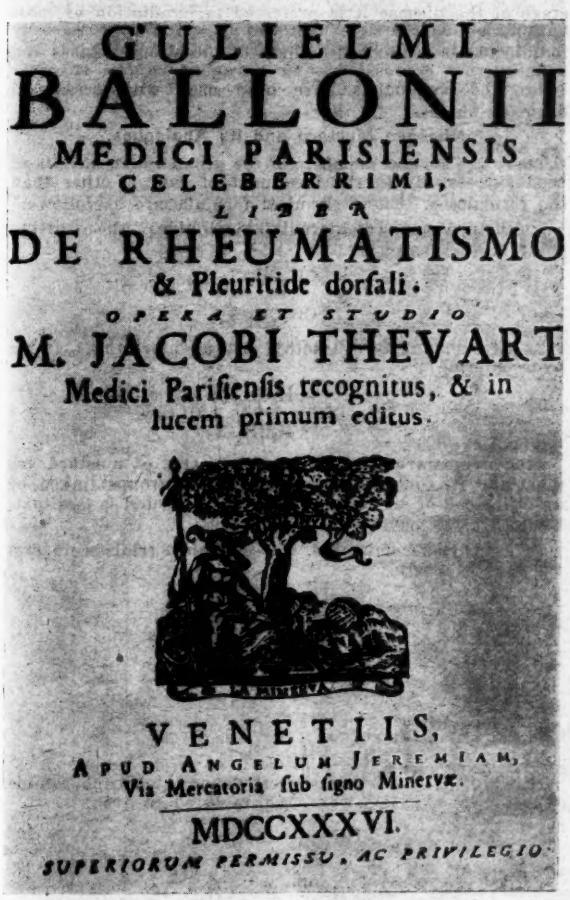
GULIELMI
BALLONII
MEDICI PARISIENSIS
CELEBERRIMI,
LIBER
DE RHEUMATISMO
& Pleuritide dorsali.
OPERA ET STUDIO
M. JACOBI THEVART
Medici Parisiensis recognitus, & in lucem primum editus.
VENETIIS,
APUD ANGELUM JEREMIAM,
Via Mercatoria sub signo Minervæ.
MDCCXXXVI.
SUPERIORUM PERMISSU, AC PRIVILEGIO.

FIGURE II.

Title page of Ballonius's *"Liber de rheumatismo"* in the 1736 edition, 120 years after the author's death, by his descendant, Dr. M. J. Thevart, of Paris. (From Ruhmann, 1940.)

rheumatologists everywhere now admit that subcutaneous nodules very like tophi are prevalent in rheumatoid arthritis.

After the discovery of cortisone it seemed at first that all disagreements were settled, and that rheumatoid arthritis was a deficiency disease of the pituitary-adrenal system. But there are no signs of endocrine deficiency in most cases of arthritis, and it cannot be suppressed with physiological doses of these hormones; a dangerous state of hyperadrenalism is required. Moreover, cortisone does not support the ancient differentiation of gout from rheumatism; it suppresses gouty and rheumatoid arthritis in the same manner and with the same dose.

In less than two years came the discovery of phenylbutazone, which suppresses arthritic inflammation nearly as decisively as cortisone does. It contradicts both the old belief in gout as a separate entity and the new belief in rheumatism as an endocrine disturbance. It suppresses gouty and rheumatic inflammation in identical fashion—which is not related to the pituitary or the adrenal.

But for its ancient prestige as the "king of diseases and the disease of kings", the very existence of gout would be challenged. The wide field of polyarthritis presents so many different pictures that it might almost be said to be a million different diseases. No two patients have exactly the same disease. The number of joints, synovial cavities and fibrous tissues which may be involved in any individual amount to several hundred. Any number of these may be involved at once or successively. The inflammation in each one may be acute, subacute or chronic, or any of the gradations between. Thus the number of possible permutations and combinations which any patient may display during thirty or forty years is infinite. It is easy to separate off a small percentage of cases which resemble each other and call them by a separate name. But if we assert that it has a different pathology, we may be as sadly astray as the primitive man who imagines that ice, water and steam are different substances.

Recurrent acute arthritis of the knees which subsides completely between attacks was described by Moore (1867) as intermittent hydrarthrosis. More recently a picture of recurring acute arthritis has been described as palindromic rheumatism (Hench and Rosenberg, 1941). In many of these cases the clinical picture is very like that of gout; but the feet are not involved and the patients are often women.

In individual cases doctors do not agree on what is rheumatism and what is gout; they agree only that gout exists as a disease of the metabolism of a non-toxic substance. Scientific doctors dislike the term rheumatism; but they have to accept the layman's broad anatomical basis and apply it to a great variety of painful disorders of joints, ligaments or muscles whose cause is unknown. The arguments still rage just as they did twenty years ago, when Poynton (1936) wrote:

> I sometimes think the ancient rheum or peccant humour has ceased flowing down from the brain of the rheumatic and is now flowing down from the brains of all of us who are fighting over what is meant by rheumatism and what are its causes.

SUMMARY.

Through two thousand four hundred years of arthritic history gout, a monarticular arthritis commencing in the feet, has always been distinguished from polyarticular rheumatism. Today's concept of it differs little from that of Sydenham, who closely followed Hippocrates.

The meaning of rheumatic, on the other hand, has changed through the ages. At first the downward flow of phlegm from the brain (catarrh), it came to signify the centrifugal flow of fluid to the extremities. The rheumatic attack was not easily differentiated from the coryzal infection which frequently caused it.

With the rise of bacteriology, every kind of arthritis was universally assumed to be infectious in origin, and gout almost disappeared. But the abandonment of the septic focus theory has permitted gout to return to its former place.

Through the discovery of cortisone and phenylbutazone, unprecedented advances have been made in the past few years. The effects of these drugs do not support the complete differentiation of gout from other arthritic diseases.

REFERENCES.

ADAMS, F. (1849), "The Genuine Works of Hippocrates", reprinted Baltimore, 1939.

BOUILLAUD, J. (1837), "New Researches on Articular Rheumatism", Philadelphia.

COMRIE, J. D. (1932), "History of Scottish Medicine", London, Volume 1.

CUSHING, H. (1924), "The Life of Sir William Osler", Oxford, reprinted 1940.

GARROD, A. B. (1859), "The Nature and Treatment of Gout and Rheumatic Gout", London.

GRAHAM, W. (1955), "Our Gouty Past", *Canadian M. A. J.*, 73: 485.

HAYGARTH, J. (1805), "A Clinical History of Diseases", London.

HEBERDEN, W. (1803), "Commentaries on the History and Cure of Diseases", London.

HENCH, P. S. (1949), "The Potential Reversibility of Rheumatoid Arthritis", *Proc. Staff Meet. Mayo Clin.*, 24: 167.

HENCH, P. S., *et alii* (1938), "Fourth Rheumatism Review. The Present Status of Rheumatism and Arthritis; Review of English and American Literature for 1937", *Ann. Int. Med.*, 11: 1089.

HENCH, P. S., and DARNALL, C. M. (1933), "Clinic on Acute, Old-Fashioned Gout, with Special Reference to its Inciting Factors", *M. Clin. North America*, 16: 1371.

HENCH, P. S., and ROSENBERG, E. F. (1941), "Palindromic Rheumatism, a 'New' Oft-recurring Disease of Joints", *Proc. Staff Meet. Mayo Clin.*, 16: 808.

HUNTER, W. (1911), "The Role of Sepsis and Antisepsis in Medicine", *Lancet*, 1: 79.

IRONS, E. E. (1942), "Theophile Bonet 1620-1689. His Influence on the Science and Practice of Medicine", *Bull. Hist. Med.*, 12: 628.

MACLAGAN, T. J. (1876), "The Treatment of Acute Rheumatism by Salicin", *Lancet*, 1: 342, 383.

MACKINNEY, L. C. (1934), "Tenth Century Medicine as Seen in the *Historia* of Richer of Rheims", *Bull. Hist. Med.*, 2: 347.

MORENO, A. RUIZ (1955), "*Las afecciones reumaticas en la obra de Rufo de Efeso*", *Arch. argent. reum.*, 18: 11.

MOORE, C. H. (1867), "Two Cases of Periodical Inflammation of the Right Knee Joint, with Remarks", *Med.-Chir. Trans.*, 50: 21.

POYNTON, F. J. (1936), "Rheumatism and Allied Diseases", *J. State Med.*, 44: 349.

POYNTON, F. J., and PAINE, A. (1900), "The Ætiology of Rheumatic Fever", *Lancet*, 2: 861.

ROLLESTON, H. D. (1940), "The History of Rheumatism in Great Britain", *Brit. J. Rheum.*, 2: 189.

RUHMANN, W. (1940), "The Earliest Book on Rheumatism", *Brit. J. Rheum.*, 2: 140.

RUSH, B. (1809), "Medical Inquiries and Observations", Philadelphia.

SAYE, H. (1934), "Translation of a 14th Century French Manuscript Dealing with Treatment of Gout", *Bull. Hist. Med.*, 2: 112.

SIGERIST, H. E. (1934*a*), "The Medical Literature of the Early Middle Ages", *Bull. Hist. Med.*, 2: 26.

SIGERIST, H. E. (1934*b*), "A Summer of Research in European Libraries", *Bull. Hist. Med.*, 2: 559.

SIGERIST, H. E. (1941), "Early Mediæval Medical Texts in Manuscripts of Montpellier", *Bull. Hist. Med.*, 10: 27.

SIGERIST, H. E. (1943), "Early Mediæval Medical Texts in Manuscripts of Vendôme", *Bull. Hist. Med.*, 14: 68.

SYDENHAM, T. (1848), "Works", translated by New Sydenham Society, London.

ADVANCED CANCER TREATED WITH NITROMIN.

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THE vesicant properties of mustard gas (sulphur mustard) were first noted in 1859 by Guthrie, and in 1931 Adair and Bagg treated with it 13 patients suffering from superficial cancer. They observed short-term benefit from its use, but the difficulties in handling the material led to its abandonment for clinical use.

Soon after the beginning of the second World War the nitrogen analogues of mustard gas were being experimented with for possible use as vesicating agents. In 1942 it was noted that the workers engaged in the project were developing blood changes—leucopenia and anæmia—from systemic absorption of the compounds.

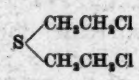
In later animal experiments it was noted that lymphoid tissue (thymus, spleen and lymph nodes), bone marrow and bowel mucosa were especially affected by the nitrogen mustard compounds. As a result, the first patient, suffering from lymphosarcoma, was treated in 1942, with satisfactory regression of enlarged lymph nodes. Since then, nitrogen mustard, its analogues and derivatives, have been used as an alternative to irradiation in the treatment of malignant disease, especially in the case of the reticuloses. The toxic effect of the compounds on a tissue is, in general, in proportion to the rapidity of its cellular growth and mitosis. It is of interest that the group has a similar action to that of X rays in that the nucleotoxic action manifests itself microscopically as delay in mitosis and fragmentation of chromosomes, and that clinically erythema and epilation follow its injection into the artery supplying the part. It is therefore described as radiomimetic.

There is an extensive literature on the effect of the group of compounds on the reticuloses. In the generalized stage of the disease it is preferred to irradiation by most authorities, as the dose that can be given by total body irradiation is limited on account of radiation sickness and bone-marrow depression. In advanced cancer of other types, the compounds have been used with occasional dramatic success.

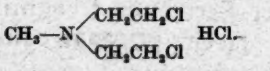
Nitrogen Mustard and its Analogues.

There are several members of the group which have been used successfully in the treatment of cancer, other than the reticuloses. Their chemical formulæ are as follows:

1. Mustard gas (dichlorodiethylsulphide), the starting point of the search:

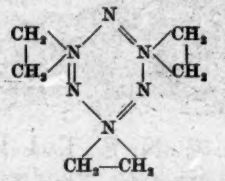


2. Nitrogen mustard (methyl bis (β-chloroethyl) amine hydrochloride):

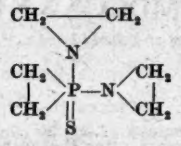


Nitrogen mustard is an amine derivative of mustard gas and, like it, contains two β-chloroethyl groups linked by an N instead of an S atom. The bis compound is less toxic than the tris compound.

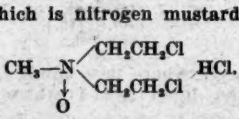
3. Triethylene melamine, whose clinical trials were first reported in 1950:



4. Thiotepa, which is triethylene thiophosphoramide, whose clinical trials were first reported in 1953:



5. Nitromin, which is nitrogen mustard-N-oxide:



The activity of these compounds is due to the liberation in solution of very reactive ethylene imonium compounds containing the group:

These compounds have cytotoxic and nucleotoxic effects on enzyme systems and on mitosis. Histologically the degenerative changes noted in the tumour cells following

TABLE I.

Substance.	Lung Tumours.	Breast Tumours.	Ovarian Tumours.	Neurogenic Tumours.	Sarcoma (Fibro- and Bone).	Chorion-epithelioma and Teratoma.	Other.
Nitrogen mustard	+	+	+	+		+	Prostate, nasopharynx.
TEM	+		+	+	+		
TEPA		+	+	+	+		Melanoma.
Nitromin	+	+	+		+	+	Stomach, liver.

the administration of nitrogen mustards (Spitz, 1948) are non-homogenous, and some cells appear to be completely spared from injury. With recovery from nitrogen mustard administration, some tumours appear to become histologically more pleomorphic than before.

The response of carcinoma of the breast and prostate—both hormone-dependent tumours—to administration of these compounds is of especial interest. It may be related to the fact that in patients treated by nitrogen mustard, examination of the adrenals revealed œdema of the cortex

TABLE II.

Patient.	Sex.	Age. (Years.)	Disease.	Extent.	Previous Treatment.	Nitromin Dosage.	Immediate Result.	Late. Result.
A	M.	59	Retroperitoneal fibrosarcoma.	Tumour of left iliac fossa, ulcerating skin.	X-ray therapy to abdomen; thio-TEPA.	400 milligrammes in 8 days orally, 24 days' interval, 500 milligrammes in 10 days orally (*plus* X-ray therapy to abdomen).	Regression of mass after first course, not after second course.	Died in three months.
B	M.	5	Fibrosarcoma of the arm.	Enormous tumour of the arm and shoulder.	——	375 milligrammes in 15 days orally, 28 days' interval, 375 milligrammes in 15 days orally (*plus* "Synkavit").	Regression dramatic, but stopped after 4 weeks, and further regression after second course.	Still alive in three months.
C	M.	49	Malignant melanoma.	Multiple nodules of the chest wall.	Repeated excision and amputation; thio-TEPA.	500 milligrammes in 10 days intramuscularly, 42 days' interval, 750 milligrammes in 22 days orally, 61 days' interval, 750 milligrammes in 33 days (*plus* "Synkavit" and prednisolone).	Regression of nodule, but recurred within 6 and 8 weeks and further regression after later courses.	Still alive in five months.
D	M.	73	Malignant melanoma.	Cervical gland.	——	750 milligrammes in 21 days orally, 47 days' interval, 750 milligrammes in 21 days orally (*plus* "Synkavit").	Regression of gland, but recurred within 6 weeks, and further regression after second course.	Still alive in three months.
E	F.	29	Carcinoma of the colon.	Liver metastases.	——	500 milligrammes in 10 days intravenously.	No response.	Died in eight months.
F	F.	65	Carcinoma of the colon.	Enormous abdominal mass.	——	750 milligrammes in 19 days orally.	Slight regression in mass.	Still alive in two months.
G	M.	47	Carcinoma of the colon.	Liver metastases, tumour of the right iliac fossa, ulcerating skin.	——	750 milligrammes in 19 days intravenously.	No response.	Died in two months.
H	M.	62	Carcinoma of a bronchus.	Mediastinal obstruction.	X-ray therapy.	400 milligrammes in 8 days intravenously.	No response.	Died in two months.
I	F.	43	Carcinoma of the cervix.	Tumour of the right iliac fossa, ulcerating skin.	X-ray therapy.	500 milligrammes in 14 days into tumour.	No response.	Died in two months.
J	F.	35	Carcinoma of breast.	Skin nodules, pleural effusions.	Testosterone.	750 milligrammes in 15 days intramuscularly, interval of 28 days, 750 milligrammes in 28 days orally (*plus* prednisolone).	Regression of nodules, regression of effusion.	Still alive in four months.
K	F.	64	Carcinoma of breast.	Breast tumour, pleural effusion, liver metastases.	Œstrogens and X-ray therapy to breast.	500 milligrammes in 10 days intravenously.	No response.	Died in one month.
L	F.	48	Carcinoma of breast.	Pleural effusion.	X-ray, menopause.	300 milligrammes in 21 days intrapleurally.	No change in effusion.	Still alive in four months.
M	F.	54	Carcinoma of breast.	Liver metastases.	——	500 milligrammes in 10 days intravenously.	No response.	Died in one month.
N	M.	10	Embryoma of kidney.	Abdominal tumour, lung metastases.	——	250 milligrammes in 19 days intravenously.	No response.	Died in two months.
O	M.	55	Carcinoma of kidney.	Liver metastases, abdominal tumour.	X-ray therapy to liver.	750 milligrammes in 15 days orally (*plus* prednisolone).	Regression of tumour—return to work.	Still alive in two months.
P	F.	28	Hodgkin's disease.	Lung and bone metastases; constant pyrexia.	Nitrogen mustard, CB 1348, "Sanomycin".	750 milligrammes in 19 days orally (*plus* prednisolone), 20 days' interval, 750 milligrammes in 19 days orally.	Complete control of pyrexia, but no change in lung or bone metastases.	Still alive in three months.
Q	F.	66	Hodgkin's disease.	Skin ulceration in arm and chest wall.	X-ray therapy.	750 milligrammes in 19 days intravenously.	Partial and slow regression.	Still alive in three months.
R	F.	42	Lymphosarcoma.	Peripheral gland enlargement.	——	750 milligrammes in 15 days intravenously.	No response.	Still alive in two months.
S	M.	49	Lymphosarcoma.	Gland and spleen enlargement; constant pyrexia.	X-ray therapy.	400 milligrammes in 8 days intravenously.	No response.	Died in two weeks.

in a proportion of cases, and decrease in the lipoid content of the cells of the *zona fasciculata*.

The following represents a summary of the available reports in the literature on the effect of various members of the group on advanced cancer:

Nitrogen mustard has been used with advantage for epithelial carcinoma of the bronchus, naso-pharynx, ovary, breast and prostate; for embryonic tumours such as chorionepithelioma and teratoma; and for neurogenic tumours such as neurogenic sarcoma, neuroblastoma, sympathoblastoma and glioma.

Triethylene melamine (TEM) has been used with benefit for carcinoma of the bronchus and ovary, for neuroblastoma, for retinoblastoma, and for fibrosarcoma.

TEPA and thio-TEPA have been beneficial in carcinoma of the breast and ovary, neuroblastoma, melanoma and fibrosarcoma.

Nitromin, as will be seen later, has been found useful for carcinoma of the bronchus, ovary, breast, stomach and liver, for chorionepithelioma and teratoma, for fibrosarcoma and for bone sarcoma.

The results are set out in Table I.

Report on Clinical Trial of Nitromin.

A group of 15 patients with advanced cancer has been treated, in addition to four with malignant lymphoma. As can be seen from Table II, there was temporary regression in skin nodules or metastatic gland enlargement in both patients with malignant melanoma treated. In both patients with fibrosarcoma there was a temporary regression in tumour mass—in one case to a dramatic extent. For these radio-resistant tumours "Synkavit" (up to 100 milligrammes daily by intramuscular injection) was added in the hope that it might act as a radio-sensitizer to the radiomimetic action of the nitromin (Mitchell, 1953). In all four patients (three of whom are still under observation) the tumour mass began to regress within one to two weeks of the start of treatment, and showed regrowth within four to eight weeks of completion of the course of nitromin. In three of the cases recurrence was easily controlled again, to an even greater extent than previously, with the second and subsequent course. It is of interest that two of the patients who responded to nitromin had previously failed to respond to thio-TEPA administration.

Of 10 cases of various types of carcinoma involving the breast, bowel, uterus, kidney or bronchus, there was response in three. In two of these there was regression in the size of abdominal tumour, and in one case of breast carcinoma there was disappearance of skin nodules and of a pleural effusion that had previously required repeated paracentesis. It should be noted that, of the seven failures in this group, in five liver metastases were already present before chemotherapy was started. A single patient with an embryonic tumour—an embryoma of the kidney with lung metastases—showed no response.

It is remarkable that there was no response in two cases of lymphosarcoma and only partial response in a further two cases of Hodgkin's disease. Prednisolone, five milligrammes three times a day, was given in some of the cases, in the hope of its acting as a radio-sensitizer to the radiomimetic action of nitromin (Hochman and Ickowicz, 1954). It also counteracts the marrow depression following the administration of the nitrogen mustard group.

Reports of Cases.

CASE I.—B., a boy, aged five years, had developed a tumour of the left forearm four months previously. A biopsy revealed anaplastic fibrosarcoma, and amputation was advised, but refused by the parents. The tumour grew steadily, and when the boy was first examined by me, it involved the forearm, the arm and the lateral pectoral and scapular areas (see Figure I). A radiographic examination revealed only a periosteal reaction of the ulna. He was given nitromin orally, to a dose of 375 milligrammes in fifteen days, and within seven days of the start of treatment the tumour began to regress in size. When regression ceased, a further course was given four weeks later, with the concurrent intramuscular administration of "Synkavit", 30 milligrammes per day, and further dramatic regression occurred by the end of the course (see Figure I). At this stage it was decided to give, in addition, a course of X-ray therapy, in the hope of achieving long-term control of the tumour. The nitromin dosage was at half the adult level, and caused only very transient change in the blood-count (see graph, Figure II).

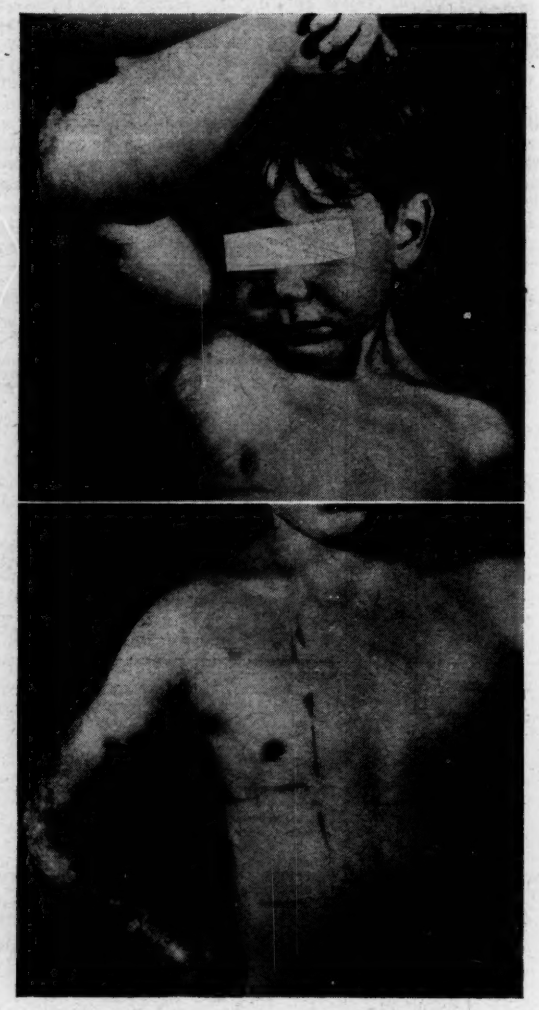


FIGURE I.

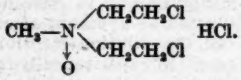
Patient B., before and after two courses of nitromin. Markings prepared for X-ray therapy. Regression of pectoral, scapular, arm and forearm infiltration.

CASE II.—C., a man, aged forty-nine years, developed malignant melanoma over the left scapula three and a half years previously. This was excised widely and the axillary glands were dissected. Nevertheless, in the ensuing two years he underwent three operations for excision of recurrent nodules, and then a forequarter amputation. In spite of this, further nodular recurrences developed rapidly in the graft area. I first instituted a course of thio-TEPA to a total of 135 milligrammes in seven weeks. This had no effect on the tumour in spite of the encouraging reports noted in the literature in this condition (Farber *et alii*, 1953; Shay and Sun, 1955). An intramuscular course of nitromin was then instituted (see Figure III) to a dose of 500 milligrammes in ten days. This caused regression of nodules within two weeks. A group of nodules was also successfully treated by X-ray therapy to determine the radio-sensitivity of the tumour. A further oral course of 750 milligrammes of nitromin in twenty-two days was given after six weeks, when improvement ceased, and led to further regression

(see Figure III). Recurrence of activity developed after a further eight weeks, and a further course of nitromin was started with the concurrent administration of "Synkavit", 100 milligrammes per day, and prednisolone, 15 milligrammes per day. Only temporary depression of the white cell count appeared after a full course of nitromin (see Figure II).

Nitromin.

Nitromin was first reported in 1946 by Stahman and Bergmann (1946). The formula is:



It is chemically described as methyl bis (β-chloroethyl) amino-N-oxide hydrochloride.

Apart from the reticuloses, the compound has been used with success in the following conditions. As reported by Kurokawa (1952), temporary regression was noted in some cases of bone sarcoma, seminoma, hepatoma, mediastinal tumour and myxosarcoma. As reported by Hamaguchi *et alii* (1953), benefit has been noted in some cases of gastric carcinoma, breast carcinoma and bronchial carcinoma. In addition, Yoshida (1953) has reported spectacular benefit in cases of chorionepithelioma with lung metastases, and also reports the disappearance of a tumour mass of carcinoma of the ovary following intraperitoneal injection. Ascites associated with *carcinomatosis peritonei*, from both gastric and ovarian carcinoma, was greatly decreased.

Most of these reports suggest only temporary inhibition of the tumour growth, followed by recurrence which, in the majority of cases, responded a second time. However,

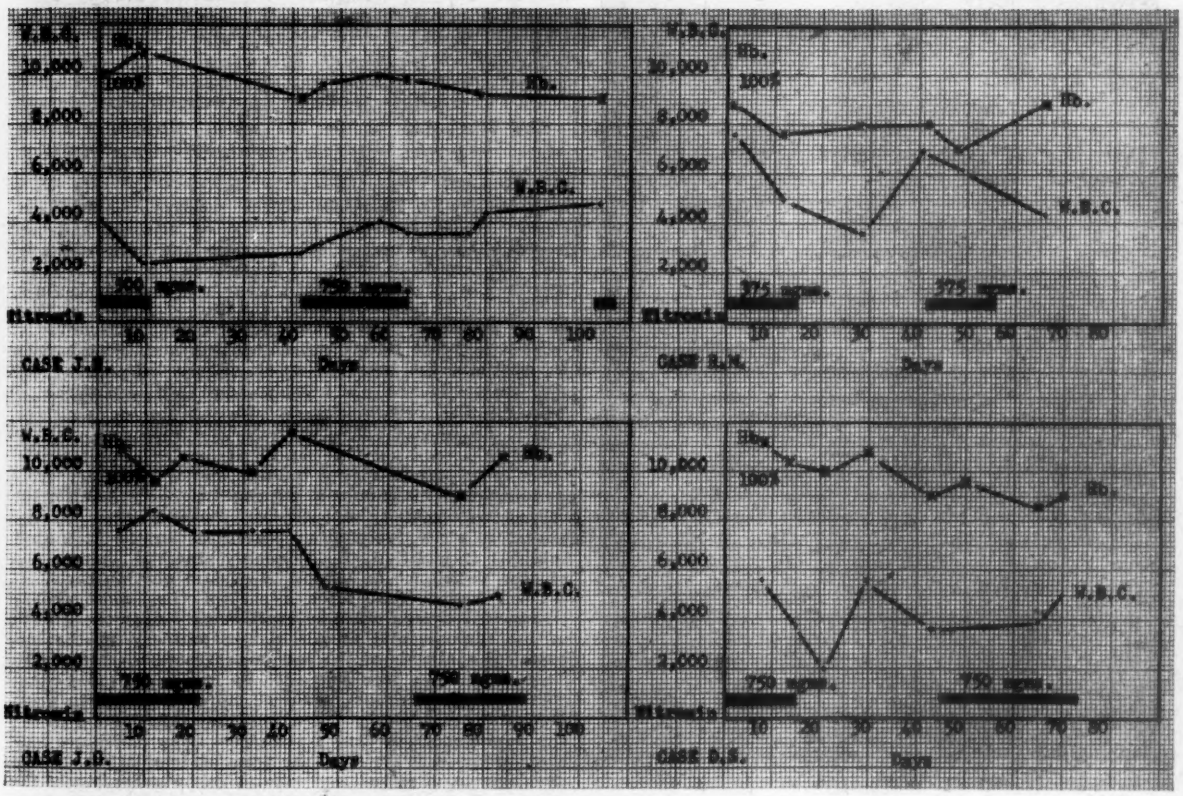


FIGURE II.
Graph to show blood changes following nitromin therapy.

Since 1949, when it was introduced by Ishidate and Yoshida, many papers have been published in the Japanese medical Press upon the use of this compound in the chemotherapy of the reticuloses and of cancer. There have been no reports on its use in either the European or American literature. This nitrogen mustard derivative is of especial interest as a cancer chemotherapeutic agent, as the ratio between the maximum tolerated dose and the minimum effective dose for rat ascites sarcoma was shown to be four times as high as that of nitrogen mustard itself. Like the other analogues of nitrogen mustard, however, it exerts its action by the liberation in solution of very reactive ethyleneimonium compounds, containing the group

death occurred finally in many of the cases from other manifestations of the disease. In the case of gastric carcinoma the results were especially beneficial in the medullary adenocarcinoma type. In the case of breast carcinoma, disappearance of pleural effusion and of pain from metastases has been reported.

Histologically, degeneration and necrosis of tumour cells were seen. Biochemically, there was an increase in the excretion of uric acid in the urine following the metabolic changes in nucleic acid metabolism which occur with the administration of all members of the nitrogen mustard group.

Hamaguchi *et alii* (1953), who described the largest series of cases, reports the complications as nausea in 30%, vomiting in 21%, anorexia in 56%, headache, lassitude and fever occasionally.

Unlike nitrogen mustard, nitromin has no vesicant action upon the skin or mucous membranes, as long as it is well diluted. In addition, its action upon the blood is somewhat slower than that of nitrogen mustard, and recovery is more rapid (see Figure II). Leucopenia has to be watched for, as the white cell count usually falls to 3000 to 4000 per cubic millimetre within two to three weeks

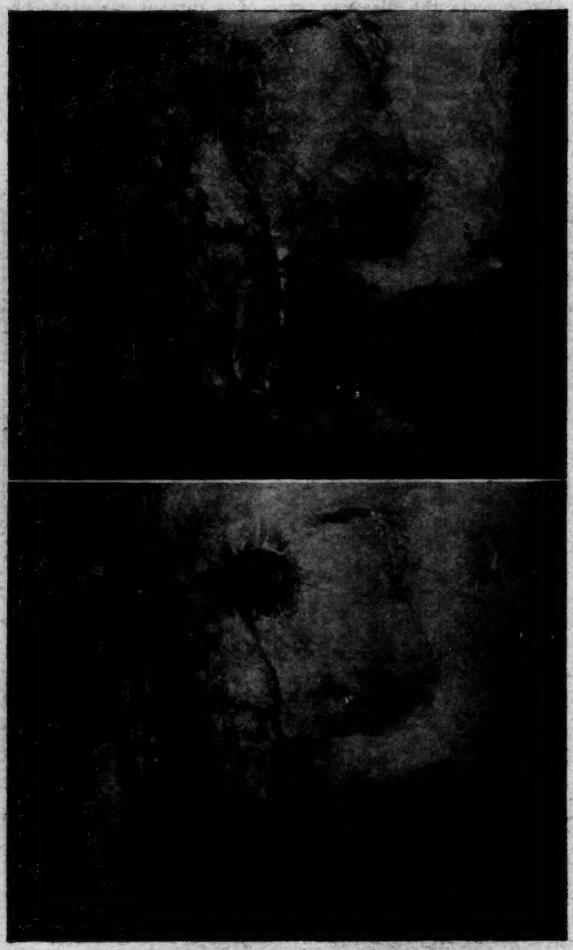


FIGURE III.

Patient C., chest wall, showing nodules (marked with arrows) which regressed on nitromin therapy. The large one at the upper edge of the graft broke down and ulcerated. X-ray therapy to the nodules in the lower right-hand section was followed by regression.

of the start of treatment, generally taking two to three weeks to recover after administration has stopped. Treatment is discontinued temporarily if the white cell count falls to 2000 per cubic millimetre. The hæmoglobin level drops 5% to 10% after the usual course of three weeks' administration of the drug, but gross anæmia and thrombocytopenia occur only if the administration is continued for over six to eight weeks. Furthermore, although nausea and vomiting often occur with the first dose, these symptoms usually disappear later. Sleepiness and dryness of the mouth are seen less often. In the rare cases in which nausea is severe after a daily dose of 50 milligrammes the compound can be given in two divided doses of 25 milligrammes, which will abolish the symptoms.

In general, resistance to the compound does not develop with a second course, as occurs with the other members of the nitrogen mustard group.

Whether nitromin is given intravenously or orally, the dose is one milligramme per kilogram. For adults, 50 milligrammes are usually given daily, dissolved in 50 cubic centimetres of saline and either injected intravenously or taken orally at least three hours after a meal or just before retiring for the night. A full course generally comprises 750 milligrammes in fifteen to twenty days, and response will often be apparent after the first week of administration. In the dilution mentioned the compound can also be injected intraperitoneally or directly into a tumour mass without causing any local reaction. This level of dosage is sufficient in most cases, but can be raised in the case of a resistant tumour. An intravenous dose of 100 milligrammes will, however, cause severe nausea, whereas 200 milligrammes will almost always cause vomiting. "Pacatal" or "Largactil" (50 milligrammes) can be given before and after the nitromin, and almost always prevents nausea.

Mode of Action of Nitromin.

The alkylating agents (to which nitrogen mustard, TEM, TEPA and nitromin belong) have the property of combining very readily at low temperature with formed nucleic acids. They owe their reactivity to their ready hydrolysis with liberation of the reactive imonium ion. It can be demonstrated that labelled nitrogen mustard becomes fixed to nucleic acid, purines and pyrimidines *in vivo* and may form abnormal nucleotides. Since the genes are nuclear accumulations of nucleic acid and nucleotides, chromosomal aberrations ensue and are particularly evident before prophase. The compounds are thus radiomimetic, in that they are mitotic inhibitors and mutagenic agents. In addition, the metabolism of cells is affected by the enzymatic changes which ensue, and which particularly affect the pyruvate oxidase system.

It has been assumed in the past that the success of the cytotoxic agents used in cancer is due to a preferential effect on rapidly dividing tissues, similar that seen from irradiation. This cannot be entirely true, because after the radioactive labelling of alkylating agents they do not appear to show preferential absorption in the cells they inhibit. In addition, the commonly observed phenomenon of drug resistance is difficult to explain on this basis. It is well known that after a certain time most chemotherapeutic agents cease to exert control over the growth of the tumour, and an alternative pathway in the biochemical synthesis of the cell is suggested in these cases. Therefore it has been suggested by Burchenal (1954) that combinations of drugs should be more efficacious in acute leuchæmia than single drugs, and that this method delays the development of drug resistance. Drug resistance may also, be due—as it is in the case of irradiation—to the development of a resistant mutant cell which replaces the whole cell population after all the susceptible cells have been destroyed.

Factors Influencing the Response to Nitromin.

1. The main factor determining sensitivity to the nitrogen mustard group is the inherent rate of growth of the tumour and its extensions. Thus, apart from lymphoid tumours, anaplastic cancer and tumours of fœtal tissue should be more sensitive to its administration.

2. The blood supply to the part determines the amount of drug delivered locally. Thus previous irradiation is unfavourable, as the blood supply is thereby decreased.

3. The dose of nitromin should be the maximum that will be tolerated without the production of toxic complications. The dosage should be fractionated, and the results are poorer with a large single dose or with excessive daily doses. This would be expected from the experimental results in animals, in which tumours are found even to be stimulated by large doses of the nitrogen mustard com-

pounds. In addition, single-dose administration ignores the radiomimetic action of the group, as it is well established that small, oft-repeated dosage of irradiation gives better end results in the treatment of tumours. Finally, the use of small doses allows the administration of a larger total dose, but with relatively little damage to the bone marrow.

The major absorption of members of the nitrogen mustard group in the cells is believed to occur within five minutes, and disappearance from the circulation has been shown after approximately twenty minutes. However, nausea and vomiting usually develop three to four hours later, as they do with X-ray therapy. Macroscopic tumour response and relief of symptoms are evident within a few days of the start of nitromin administration in some cases—very much sooner in my experience than from other members of the group.

Larionov (1956) stresses that in the search for a new nitrogen mustard derivative the aim is to provide a higher ratio of tumour depression to marrow depression, with less likelihood of nausea and vomiting. This, in my opinion, is better achieved by nitromin than by any member of the group tried in the treatment of advanced cancer.

Summary.

The result of administration of nitromin (nitrogen mustard-N-oxide) in 19 cases of advanced cancer and reticuloses is reported. The compound has the advantage of a high ratio of tumour depression to marrow depression in the tumours sensitive to its administration. The complications of nausea and vomiting are minimal. The results were dramatic in several cases of advanced tumours, including fibrosarcoma and melanoma. In two cases in which the tumours responded to nitromin there had been previous failure to respond to thio-TEPA administration. "Synkavit" and "Prednisolone" were given concurrently in some cases, in the hope of their acting as radiosensitizers to the radiomimetic action of the nitromin.

Acknowledgements.

I am indebted to the distributors, Takeda Pharmaceutical Industries, Limited, Osaka, Japan, for a free trial supply of the drug.

References.

ADAIR, F. E., and BAGG, H. J. (1931), "Experimental and Clinical Studies on Treatment of Cancer by Dichlorethyl-Sulphide (Mustard Gas)", *Ann. Surg.*, 93: 190.

BURCHENAL, J. H. (1954), "Clinical Management of Leukemias", *Cancer Res.*, 14: 615.

FARBER, S., APPLETON, R., DOWNING, V., HEALD, F., KING, J., and TOCH, R. (1953), "Clinical Studies on the Carcinolytic Action of Triethylene Phosphoramide", *Cancer*, 6: 135.

HAMAGUCHI, E., IWAI, Y., and SHIMODA, T. (1953), "Clinical Studies on Cancer Chemotherapy with Nitrogen-Mustard n-oxide (Nitromin)", *J. Japan M. A.*, 29: 635.

HOCHMAN, A., and ICKOWICZ, M. (1954), "Treatment of the Resistant Stages of Hodgkin's Disease and Lymphoblastic Diseases", *Brit. J. Radiol.*, 27: 467.

ISHIDATE, M. (1952), "A New Tumor-Retarding Agent: Nitrogen Mustard n-oxide", *Gann*, 43: 171.

KUROKAWA, T. (1952), "Clinical Experience about the Nitromin Treatment of Malignant New Growths", *Chiryo*, 34: 10.

LARIONOV, L. F. (1956), "Immediate and Remote Results of Chloroethylamine Treatment of Hodgkin's Disease", *Brit. M. J.*, 1: 252.

MITCHELL, J. S. (1953), "Clinical Assessment of Tetra-sodium 2-methyl-1: 4-naphthohydroquinone Diphosphate as a radiosensitizer in the Radiotherapy of Malignant Tumours", *Brit. J. Cancer*, 7: 313.

SHAY, H., and SUN, D. C. H. (1955), "Clinical Studies of Triethylene Thiophosphoramide in the Treatment of Inoperable Cancer", *Cancer*, 8: 498.

SPITZ, S. (1948), "The Histological Effects of Nitrogen Mustards on Human Tumors and Tissues", *Cancer*, 1: 383.

STAHMANN, M. A., and BERGMANN, M. (1946), "Nitrogen Mustard Gases. VIII: Oxidation of the Nitrogen Mustard Gases by Peracids", *J. Org. Chem.*, 11: 586.

YOSHIDA, T. (1953), "Results of the Clinical Application of Nitromin", *Shindan To Chiryo*, 41: 5.

CHLORPROMAZINE BASAL NARCOSIS FOR THYROIDECTOMY.

By B. F. FORD,
Canberra.

IN recent years there has been a remarkable reduction in the mortality rate for thyroidectomy. This improvement has, in a large measure, been due to improvement in anæsthetic techniques.

The present conventional anæsthetic technique for thyroidectomy is the endotracheal administration of nitrous oxide and oxygen, usually in a closed circuit. The disadvantage of this technique is that it prohibits inspection of the cords, either during or at the termination of anæsthesia, should the surgeon have fears for the recurrent laryngeal nerve. Another disadvantage of this technique is that some surgeons complain that venous oozing is increased, owing to the resistance of the rebreathing bag. The practice of giving small doses of a relaxant, to ensure smoothness of anæsthesia and a quiet patient, and then assisting respiration, greatly increases venous oozing by raising intrathoracic pressure.

A large number of thyroidectomies have been performed at the Canberra Community Hospital over the past seven years with the employment of a cervical nerve block together with local infiltration of the front of the neck with 0·05% amethocaine solution containing adrenaline hydrochloride (1 in 200,000). This series was without mortality; but the surgeon was dissatisfied with the technique because the opiates employed to sedate the patient during the operation often caused troublesome post-operative vomiting. Further, even when large doses of narcotics were used, the patient sometimes looked back on the operation as an ordeal.

A close study of reports of the use of "Largactil" in anæsthesia—particularly basal narcosis and "potentiated anæsthesia"—emboldened us to modify this technique for use with thyroidectomy.

Technique and Dosage.

The technique involved the pre-operative administration of a mixture of chlorpromazine, promazine and pethidine, coupled with local infiltration of the front of the neck.

On the night before the operation the patient was given 1·5 grains of "Nembutal" and 50 milligrammes of chlorpromazine by mouth.

One hour before operation the patient was given 50 milligrammes of chlorpromazine and 100 milligrammes of pethidine. This usually left the patient drowsy and relaxed, but more alert and cooperative than patients to whom maximal doses of morphine and hyoscine had been administered.

Twenty minutes before operation the following mixture was administered intravenously: chlorpromazine 50 milligrammes, promazine 50 milligrammes, pethidine 100 milligrammes, normal saline to 20 cubic centimetres. The mixture was administered in divided doses, first eight cubic centimetres, and then ten minutes later six cubic centimetres. A few minutes before the patient was draped the general condition was examined; if the patient was sleeping quietly, or conscious but drowsy and apathetic, no further dose of the mixture was administered; if the patient was awake or restless the remaining six cubic centimetres were given before draping.

This general dosage schedule was not strictly adhered to, the amounts of the divided doses being modified according to the size and pre-operative mental state of the patient; but the technique of administering the mixture in three doses—the final dose being given immediately before operation, or withheld for later administration if necessary—was adhered to.

The patient was then postured, the skin prepared, and the site of the incision and flaps infiltrated with about 30 cubic centimetres of 1% "Novocain" solution with

adrenaline (1 in 100,000). The operation was then carried out with no other anæsthesia, except the injection of small quantities of "Procaine" at stages of the dissection which produced discomfort. This was most notable during the freeing of the upper poles of the gland, and during the search for the middle thyroid artery; traction on arteries appeared to be the essential stimulus for pain.

Clinical State Under Basal Narcosis.

About five minutes after the intravenous injection of the first dose of the mixture, pronounced clinical effects were observed. The patient's appearance was, as has been described in the literature, that of death. The complexion was pale and waxy, the skin cool and dry, the facies sunken. The respirations were shallow and somewhat increased in rate, the pulse was rapid, of low tension, but regular in time and amplitude. The mouth usually hung open, and in most cases a small oral airway could be inserted with ease—although several patients began to chew them, and pushed them out negligently with their tongues, with the lazy unhurried manner of a cow chewing its cud.

The corneal reflex was not lost. In no case was consciousness completely lost, although its extent was variable—from the patient who snored quietly throughout the entire operation, and could only respond to shouted commands to move a little or say "ee", to the patients who were fully conscious, but sleepy and apathetic.

There was complete absence of fear or any other affective reaction. The patient's response to pain was to mutter or groan vaguely or move the legs and arms a little; these patients quietened down when spoken to reassuringly, but usually went to sleep again when the stimulus was abolished by the injection of a little local anæsthetic, or by reducing traction on blood vessels or the trachea.

In most cases there was complete amnesia for the whole of the operation and for most of the following day.

The patients' mental state was well conveyed by an onlooker, who described them as "zombies", and this description, as the living dead, well suited their reactions to stimuli and also their physical appearance.

Analysis of Results.

In all fifteen patients were subjected to thyroidectomy under this type of basal narcosis. The indications for operation were as follows: carcinoma of the thyroid, one case; thyrotoxicosis in nodular goitre, eight cases; solitary adenoma, five cases; toxic adenoma, one case.

In all cases basal narcosis was satisfactory, and the operation was performed with ideal operating conditions. Three of the patients were restless and the operation had to be stopped for a few minutes to calm them. In these cases the cause of the restlessness was found to be some very tangible discomfort; one patient felt pain in her heels, from the hard edge of the operating table; one was alarmed by the weight of the dislocated gland, laden with artery forceps, dragging the trachea; one felt suffocated by drapes about the face.

In one case the operation was postponed after the basal narcosis had been commenced when it was discovered the patient had not been taking her iodine before operation. In this case the patient had been very restless just after basal narcosis was completed, and when she was operated on ten days later, it was decided to use regional nerve block and morphine lest the restlessness prove uncontrollable. This patient had a basal metabolic rate of +65%, and when the cases were reviewed, it was found that all the patients who were restless had basal metabolic rates of +40% or over.

In every case I was prepared to administer a small dose of "Pentothal", and pass an endotracheal tube, to convert basal narcosis to general anæsthesia if restlessness made this necessary, but this did not occur.

The patients who were restless had an unpleasant nightmare-like recollection of the operation; none of them remembered pain. All the other patients had complete amnesia for about eight hours after the mixture had been administered.

At the termination of the operation, all patients were sufficiently rousable to be persuaded to say "ee" sufficiently clearly to reassure us that the larynx was functioning normally.

The most interesting feature was the small quantity of morphine required to control pain after the operation. Eleven patients required no post-operative narcotics whatsoever; two patients were given a 0·25 grain of morphine twenty-four hours after operation, and one patient was given that dose twelve hours after operation. One patient had an attack of distressing tachycardia and restlessness eight hours after operation, for which morphine was administered; this did not adequately control the attack, which was completely controlled in half an hour by the intramuscular administration of 50 milligrammes of "Largactil". This patient had been given only 10 cubic centimetres of the mixture of the "lytic cocktail" because the syringe jammed. She was restless during operation, but controllable. It was thought that this would have been a successful case if the full dose had been administered.

All patients were ready for discharge from hospital on the sixth day, although in three cases discharge was postponed for social or domestic reasons.

Liver function tests were performed on all patients before their discharge from hospital; in no case was there evidence of liver damage. There was no case of jaundice.

Complications of Basal Narcosis.

The following complications were encountered: restlessness, three cases; palpitations, one case; vomiting, one case. No patient remembered the operation.

Post-Operative Sedation.

The post-operative sedation required was as follows: no post-operative sedation, 11 cases; sedation twenty-four hours after operation, two cases; sedation twelve hours after operation, one case; sedation eight hours after operation, one case. After returning to the ward the patients slept quietly for six to eight hours. As all patients had their cough reflexes, a nurse continuously in attendance was not considered necessary, but very frequent observations of the patient were made.

Discussion.

Fifteen cases of thyroidectomy under "lytic cocktail" basal narcosis *plus* local anæsthetic infiltration are described.

In all cases good operating conditions were obtained, all patients were sufficiently rousable to test for laryngeal paralysis, and all patients required very little or no post-operative narcotics for control of pain. The chief untoward reaction was restlessness, which was insufficient to cause more than minor difficulties for the surgeon, and which occurred in only a small proportion of cases.

In no cases were permanent or serious sequelæ observed.

It is fully realized that this is a very small number of cases on which to assess the value of an anæsthetic technique; but in these the results were so satisfactory that we have decided to continue this technique, and it is reported in the hope that advice and criticism will be roused.

From an analysis of the results there is a suggestion that the technique may prove unsuitable for very nervous patients with a high basal metabolic rate in whom restlessness was a feature. In such cases, however, general anæsthesia could easily be induced, and the value of the "lytic cocktail" in lowering the basal metabolic rate and improving convalescence is retained.

Acknowledgements.

Thanks are due to Dr. A. A. Wearne, whose patience and gentle surgical technique undoubtably contributed largely to the success of the anæsthesia, and to the interested cooperation of the ward and operating theatre staff of the Canberra Community Hospital.

THE MORTALITY OF CHILDHOOD IN AUSTRALIA: PART I. EARLY CHILDHOOD.

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This paper reviews the mortality of young children as part of my general survey of mortality in Australia. It gives Australian statistics, chiefly derived from *Demography*, the annual bulletin of the Bureau of Census and Statistics, Canberra, which will enable comparisons to be made with the recent reviews of van Gelderen (1955), and of the United Nations (Studies I and II, 1954). There is unfortunately no agreed term for children between their first and fifth birthdays. They will be referred to as being pre-school children or as being in early childhood, although some authors would reserve "pre-school" for children between the second and fifth birthdays. Since this paper covers mortality from all causes, it may be regarded as a companion of my survey of infant mortality (Lancaster, 1956). It will, moreover, serve to give later information on the mortality from infective disease than has so far been given in the survey.

THE MORTALITY OF EARLY CHILDHOOD.

Van Gelderen (1955) has shown how, in the Netherlands, the age distribution within this age group was affected by the sudden increases of fertility immediately after the second World War. If the children at the lower ages—that is, at an age of one year on the last birthday—are heavily represented, then the rate for the whole group will tend to be higher. This may be overcome by standardization, which will not be attempted here because, unless the birth rates have altered very rapidly, the standardized rates are usually very close to the actual. Examples of this close approximation are shown in Table XXIV of the "Registrar General's Statistical Review of England and Wales for the Two Years, 1948-1949", in which the difference in the two rates nowhere exceeds 3% for single calendar years. The differences would be less if periods of several years were considered.

In Table I are given the death rates for each sex at the age of one year, and also for children aged one to four years on the last birthday. There has been a remarkable decline in the mortality rates at these ages. Before 1881 the death rates at the age of one year were high, about 46 per 1000 *per annum*. These rates are about twenty times their value in the years from 1951 to 1954. After 1881 the rates declined steadily until the present day. This decline is well displayed in Figure I. The mortality rates at the ages of from one to four years—that is, the whole of the pre-school children—have followed a similar course, the decline beginning somewhere about 1881 and continuing to the present day; in the latest period the rate is about one-tenth of the rates existing before 1881. In Table I and Figure I the mortality rates of the girls are more favourable than those of the boys.

TABLE I.
The Total Mortality in Australia of Early Childhood.[1]

Period.	Deaths per Million *per Annum*.			
	At Age One Year.		At Ages One to Four Years.	
	Males.	Females.	Males.	Females.
1860 to 1875 (i)	46,200	45,200	22,400	21,600
1870 to 1881 (ii)	45,500	43,100	21,276	19,871
1881 to 1890 (iii)	35,760	34,270	16,606	15,827
1891 to 1900 (iii)	26,850	25,190	12,582	11,916
1901 to 1910 (iii)	18,040	16,840	8,140	7,608
(1908 to 1910)	15,368	13,903	7,209	6,675
1911 to 1920	15,125	13,395	7,345	6,654
1921 to 1930	11,206	9,651	5,489	4,742
1931 to 1940	6,921	6,145	3,822	3,339
1941 to 1945	5,450	4,659	3,142	2,625
1946 to 1950	3,318	3,033	1,978	1,583
1951 to 1954	2,935	2,740	1,771	1,463

[1] The data used for the abovementioned rates were taken from (i) M. B. Pell (1879), *J. Inst. Actuaries & Assurance Magazine*, 21: 257; Pell's data are for New South Wales only. (ii) A. F. Burridge (1884), *ibidem*, 24: 333; Burridge has combined data from New South Wales, Victoria and Queensland. (iii) Census of the Commonwealth of Australia, 1911.

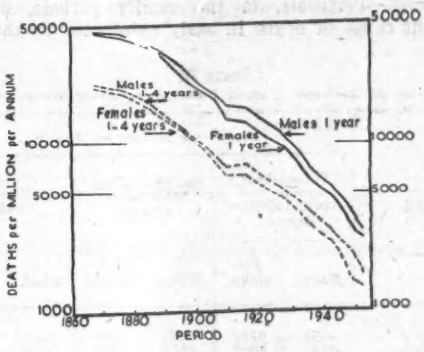

FIGURE I.
The decline in mortality of early childhood in Australia. (Semilogarithmic grid.)

The changes in mortality of early childhood have been almost as important as the reductions in the infant mortality in lengthening the expectation of life. This can be determined by an analysis of the various life tables prepared by the Bureau of Census and Statistics, Canberra.

The data necessary for the computation of the infant mortality rates are so readily obtained that they are generally used as an index of hygiene or of social well-being. Nevertheless, where the mortality at the age of one year is available it may be held to be an index of the general well-being of the community, more sensitive than the infant mortality ("Registrar-General's Statistical Review for England and Wales for the Year 1923"). However, a similarly sensitive index can be obtained by considering only deaths which occur in the second to twelfth months of the first year of life. In other words, the infant mortality, from which neonatal mortality has been excluded, is also a rather sensitive index. This refinement, however, will often not be available.

Infective Disease as the Main Cause of the Declines in Mortality.

It is readily shown that practically the whole of the decline in the mortality rates of early childhood has occurred because of changes in the outcome and incidence of the diseases caused by bacteria, viruses and other infective agents. For the purposes of the general survey I have taken (Lancaster, 1952*a*) acute infective disease as all those diseases of Class I of the fifth revision of the International List, together with meningitis, encephalitis and brain abscess and gastro-enteritis, but excluding syphilis and tuberculosis. In Table II and in Figure II of this paper, however, it is convenient to bring tuberculosis and syphilis into the same group as the other infective diseases. The common diseases of the respiratory system which cause death at these ages, bronchitis and the pneumonias, hold a rather ambiguous position as they are commonly not thought of as infective. They are therefore kept apart from the other infections in Table II. In Table II the death rates at each period have been apportioned to the infections, diseases of the respiratory system, and all other diseases. When we consider that "all other diseases" includes death in convulsions, when no primary cause has been specified, it is evident that practically no reduction in mortality has occurred in the whole group of diseases, other than the infections and the respiratory diseases, which are classed together in Table II as due to "all other causes". Of course, the reduction in mortality

assigned to convulsions is also probably due to the decline in undiagnosed infections such as *otitis media* and meningitis.

Pertussis, Measles, Diphtheria and Scarlatina.

In this and the succeeding sections, the diseases or groups of diseases are briefly reviewed as causes of death.

A general discussion will follow dealing with the general ecological factors which underlie the reduction in mortality.

Pertussis.—Pertussis, in the earlier periods, was an important cause of death in early childhood. In the most recent periods it was an uncommon cause of death. In every period the masculinity is low. Pertussis is practically the only disease of numerical importance which more heavily affects the females at this age. The explanation, of course, is still unknown. Case fatality rates and prevalence rates in England are both higher for females, as is shown by the tables of the "Registrar-General's Statistical Review of England and Wales". Similar data are not available for the Australian experience. The case fatality rates reveal a pronounced decline with increasing age. Pertussis is a disease whose killing power will be considerably diminished by any factor which tends to delay the age of infection. It is thus very sensitive to general social conditions and hygiene.

TABLE II.

The Mortality in Australia of Early Childhood by Broad Groups of Causes.

Period.	Deaths per Million *per Annum*.					
	Tuberculosis, Syphilis and Acute Infective Diseases.		Diseases of the Respiratory System.		All Other Causes.	
	Males.	Females.	Males.	Females.	Males.	Females.
1908 to 1910 ..	4074	3732	1193	1061	1942	1882
1911 to 1920 ..	4117	3840	1370	1179	1858	1635
1921 to 1930 ..	2733	2451	1199	1020	1557	1271
1931 to 1940 ..	1597	1488	862	743	1363	1106
1941 to 1945 ..	1196	1091	622	478	1324	1056
1946 to 1950 ..	516	448	351	303	1111	832
1951 to 1954 ..	388	331	309	287	1074	845

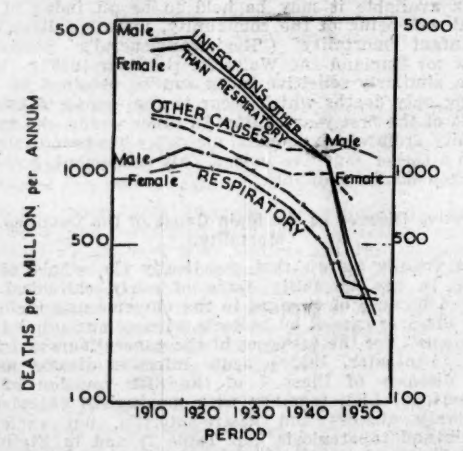

FIGURE II.

A comparison of the declines in the mortality in early childhood due to infective diseases, respiratory disease and all other causes in Australia over the years 1908 to 1954.

Measles.—As has been previously noted (Lancaster, 1952*b*), measles has been prevalent in irregularly spaced epidemics in Australia. The years 1908 to 1910 happened to be years of low prevalence. There is therefore, in Table III, an increase in the rates in passing from the period 1908 to 1910 to the next period, 1911 to 1920. Since then there has been a steady fall in the rates.

Diphtheria.—The great bulk of the deaths from diphtheria has usually fallen in early childhood and in the early school years. For early childhood, in Table III, the rates are highest in 1911 to 1920, when they were about 800 per million *per annum*. Since then there has been a remarkable fall. There seems to be some reason for believing that immunization has played a part in this fall; however, neither the immunization, which could have been effective only after 1930, nor the use of potent therapeutic serum, which was in common use after 1920, can explain the general decline in diphtheria mortality. We shall return to this topic later. In the meantime it may be noted that the fall in pertussis mortality has been almost as rapid as that of diphtheria, if we measure the fall on a logarithmic scale (or ratio chart) as in Figure III.

Scarlatina.—Since 1908 scarlatina has not been a major cause of mortality. The fall in the death rates was greatly accelerated after 1931.

Infective Disease of the Nervous System.

Meningitis.—Meningitis, in Table III, includes all forms of simple—that is, non-tuberculous—meningitis. The reduction in the rate from this group has been almost as great as in the rates from diphtheria. It should be noted that the most important part of the fall occurred before the introduction of chemotherapy or antibiotics and that a rise even occurred in the rates over the war years at a time when chemotherapy was being used.

Encephalitis and Brain Abscess.—Encephalitis and brain abscess have been numerically of less importance than the simple meningitis group, and a decline in the rates is again evident.

Poliomyelitis.—Poliomyelitis has been relatively unimportant as a cause of mortality at these ages; no definite trend is discernible.

Infections of the Bowel.

Typhoid and Paratyphoid Fevers and Dysentery.—Typhoid and paratyphoid fever and dysentery have been of little importance as causes of death in early childhood. However, it may be that difficulties of definition arise, making differentiation from gastro-enteritis problematical.

Gastro-enteritis.—Gastro-enteritis has been numerically the most important of all diseases in early childhood until recent times. Of individual causes, it has contributed most to the general decline in total mortality. In fact, over one-third of the decline in total mortality has been due to the decline in gastro-enteritis mortality. Chemotherapy and antibiotics cannot be regarded as the cause of this decline.

Influenza and Diseases of the Respiratory System.

Influenza.—Influenza has been a relatively unimportant cause of death. There has been no general tendency for the rates to fall. The rates in the period from 1911 to 1920 are high because of the pandemic of influenza in the years 1918 and 1919 (Table IV).

Diseases of the Respiratory System.—Diseases of the respiratory system are really bronchitis and the pneumonias. The rates have been given in Table II. There has been a decline in the mortality from these causes, more rapid since 1940. This is possibly due to the introduction of chemotherapy and antibiotics.

Diseases of the Alimentary System.

Since we have already taken out gastro-enteritis from the class of alimentary diseases in the International List of Causes of Death, the residue consists chiefly of deaths from hernia, from intestinal obstruction and from appendicitis. There appear to have been recent reductions in the death rates which had been practically stationary till 1945 (Table IV).

TABLE III.[1]

The Mortality of Pre-School Children in Australia from Certain Infective Diseases.
(Ages one to four years.)

Period.	Deaths per Million *per Annum*.													
	Pertussis.		Measles.		Diphtheria.		Scarlatina.		Meningitis.		Encephalitis.		Poliomyelitis.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1908 to 1910 ..	235	303	128	99	683	570	79	76	514	456	15	18	—[1]	—
1911 to 1920 ..	221	290	289	257	833	791	57	61	503	418	31	27	—[1]	—
1921 to 1930 ..	193	256	142	132	564	489	63	73	234	175	53	51	24	23
1931 to 1940 ..	126	187	82	78	442	411	38	44	113	84	27	22	28	19
1941 to 1945 ..	69	112	66	66	267	258	14	16	201	136	41	32	11	7
1946 to 1950 ..	17	27	49	52	83	58	3	3	101	62	18	27	14	9
1951 to 1954 ..	6	9	28	19	25	18	1	1	118	78	36	31	22	16

[1] In Tables II to VII the mortality rates apply to children of ages one to four years last birthday.

Syphilis, Tuberculosis and Septic Conditions.

Congenital Syphilis.

Syphilis has not been an important cause of death at this age during the years of the survey, but a relatively large decline has occurred in the mortality rates.

Tuberculosis.

Tuberculosis was of great importance in the earlier periods, especially in the form of tuberculous meningitis. There has been a pronounced decline in the rates, which is still continuing. Here again we should note that the declines began before the advent of adequate public health measures or therapy (Lancaster, 1950*a* and 1950*b*).

Erysipelas.

Erysipelas, never an important cause of death, has caused no deaths in the latest period.

Purulent Infections.

Under the title of purulent infections the rules of the International List include pyæmia and septicæmia. There has been a general, although not pronounced, tendency for the rates to fall.

Septic Conditions of the Skin and Cellular Tissues and of the Bones.

Under the heading of septic conditions of the skin, cellular tissues and bones are included deaths from two classes of the International List. It is probable that practically all these deaths are attributable to septic conditions —that is, cellulitis and other lesions of the connective tissues due to staphylococci, streptococci and related organisms. A pronounced reduction has occurred since 1940, presumably owing to chemotherapy and antibiotics.

Tetanus.

The mortality from tetanus at this age has remained rather constant. It appears that universal immunization of children with toxoid, as recommended by Johnson (1956), would abolish the mortality as it has in the armed forces (Boyd and MacLennan, 1942). The effects of this immunization have persisted into peacetime, causing the lessened rates among men of military age in England (Wright, 1953) and in Australia (Lancaster, 1953).

Neoplasms and Leuchæmia.

Neoplasms, as a whole, have not been an important cause of mortality of young children.

Malignant Diseases.

The death rates from malignant disease (cancer) have remained rather steady.

Leuchæmia and Hodgkin's Disease.

Leuchæmia and Hodgkin's disease cannot well be separated in the earlier periods. There has been a rise in the rates. It is difficult to decide whether this increase is real (Lancaster, 1955) or reflects a change in diagnostic standards.

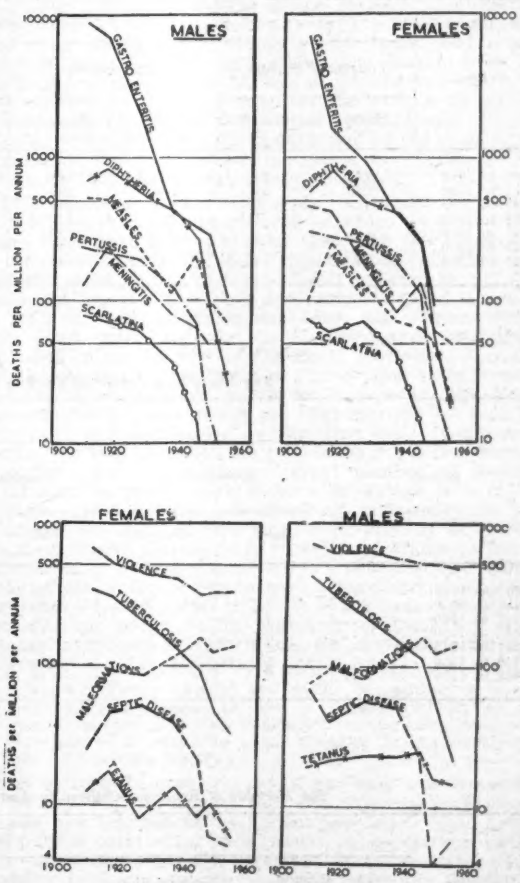

FIGURE III.

A comparison of the declines in the mortality in early childhood (ages one to four years) due to individual infective diseases in Australia over the years 1908 to 1954.

Other Tumours.

The mortality from other tumours (non-malignant) has never been high. It is probable that changes in definition have brought about the changes shown in Table V—namely,

TABLE IV.

The Mortality of Pre-School Children in Australia from Infective Diseases of the Alimentary and Respiratory Systems.

Period.	Deaths per Million *per Annum*.									
	Typhoid and Paratyphoid.		Dysentery.		Gastro-enteritis.		Influenza.		Diseases of Alimentary System.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1908 to 1910	25	32	17	18	1869	1725	47	41	179	177
1911 to 1920	20	22	10	8	1676	1519	101	102	227	188
1921 to 1930	6	9	36	24	1096	940	56	52	195	167
1931 to 1940	2	2	18	12	415	394	94	48	182	148
1941 to 1945	1	1	13	7	277	266	83	73	164	119
1946 to 1950	1	0	7	7	101	93	36	40	100	77
1951 to 1954	0	1	4	4	97	99	8	10	64	38

TABLE V.

The Mortality of Pre-School Children in Australia from Congenital Syphilis, Tuberculosis and Neoplasms.

Period.	Deaths per Million *per Annum*.									
	Congenital Syphilis.		Tuberculosis.		Cancers.		Leuchæmia and Hodgkin's Disease.		Other Tumours.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1908 to 1910	24	21	411	342	42	50	25	18	3	2
1911 to 1920	22	20	318	292	38	33	22	15	4	1
1921 to 1930	10	9	218	197	38	36	31	24	4	5
1931 to 1940	6	5	142	127	33	38	40	34	31	29
1941 to 1945	2	2	112	92	43	39	66	45	25	29
1946 to 1950	1	2	57	51	61	33	60	49	13	17
1951 to 1954	1	1	22	31	45	45	68	68	17	14

TABLE VI.

The Mortality of Pre-School Children in Australia from Septic Diseases and Tetanus.

Period.	Deaths per Million *per Annum*.							
	Erysipelas.		Purulent Infections.		Septic Conditions of the Skin, Cellular Tissues and Bones.		Tetanus.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1908 to 1910	5	7	25	20	68	24	19	12
1911 to 1920	8	7	29	25	39	45	21	17
1921 to 1930	7	7	21	14	55	50	23	8
1931 to 1940	3	3	17	10	50	37	23	13
1941 to 1945	0	0	18	18	23	20	25	8
1946 to 1950	1	0	12	9	4	6	16	10
1951 to 1954	0	0	12	13	11	9	15	6

TABLE VII.

The Mortality of Pre-School Children in Australia from Diseases of Miscellaneous Systems and Causes.

Period.	Deaths per Million *per Annum*.											
	Other General Diseases.		Nervous System.		Circulatory System.		Malformations.		Violence.		Ill-Defined.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1908 to 1910	68	39	404	436	81	110	74	46	708	639	186	229
1911 to 1920	76	61	376	389	66	70	98	89	627	507	159	151
1921 to 1930	82	74	219	180	48	49	83	85	628	428	75	64
1931 to 1940	75	62	110	104	40	40	115	115	580	397	28	22
1941 to 1945	91	100	108	107	34	46	148	159	540	311	16	24
1946 to 1950	66	60	81	79	20	24	123	124	519	318	15	14
1951 to 1954	40	50	54	53	24	30	157	137	498	317	14	10

a sudden rise in 1931. It is difficult again to decide whether this apparent increase reflects a real rise in incidence.

Other Diseases Groups.

The heading "Other General Diseases" of Table VII includes all the diseases under the same title in the various revisions of the International List, together with other minor causes of mortality. Among such causes are the avitaminoses, thyroid and other endocrine disorders, rheumatism, diabetes, pink disease and diseases of the blood, other than the leuchæmias. This group, as a whole, obviously has had little effect on the decline of the total mortality in early childhood.

Diseases of the Nervous System.

Diseases of the nervous system, as defined here, include all the rubrics of the class of the same name of the International List of Causes of Death, except meningitis, brain abscess or encephalitis. There have been considerable declines in the mortality from the residue of diseases so defined. However, the group comprising convulsions of children aged under five years is included, and there are reasons for believing that convulsions were often secondary to undiagnosed acute infective disease and *otitis media*. Thus here again the decline may be in infective causes.

Diseases of the Circulatory System.

Table VII shows a slight fall over the years of the survey in the mortality from diseases of the circulatory system.

Malformations.

The mortality from malformation has been almost constant since 1911. The rise in rates from the period 1908 to 1910 to the period 1911 to 1920 is possibly due to changes in definitions after the introduction of a new revision of the International List. The higher rate in the period 1941 to 1945 is an aftermath of the rubella epidemics, especially those in 1938, and 1940 to 1941 (Lancaster, 1951; Rutstein, Nickerson and Heald, 1952).

Violence.

There has been a small decline in the mortality from violence of male children and a rather larger decline in the mortality of the female children. F. W. Clements has analysed the Australian mortality official data and carried out a survey on accidents; for references see Lancaster (1956).

Ill-Defined.

The diseases previously grouped under the heading "ill-defined" have largely been transferred to other disease groups. There is a pronounced decline in the ill-defined diseases, or rather the ill-defined diagnoses.

DISCUSSION.

It is evident, from the tables, that the decline in the mortality of early childhood in Australia has been due almost entirely to changes in the mortality from infectious disease. Of course, there have been great improvements in medical practice, so that the modern treatment of infective disease is attended with lower case fatality rates than ever before (for example, McLorinan, 1956), control methods are more highly developed than previously (Johnson, 1956; Jungfer, 1956), and the risks of hospital infection from patient to patient have been minimized by proper attention to nursing detail. However, it is a mistake to project these recent improvements back and to think of them as the leading cause of the declines in mortality. General factors, loosely combined under the terms hygiene and social conditions, have been very important. These general factors include diet, housing, education and family size. It is difficult to separate the effects of individual factors, since usually changes in one will be accompanied by changes in other factors. The usual explanations of the declines in mortality rather exaggerate the effect of therapeutics and specific public health measures. Useful correctives to these purely medical discussions have been supplied by Greenwood (1935 and 1936), and by Yule in a discussion on Greenwood's (1936) paper. Yule gives as an example the disappearance of the body louse from English populations. This disappearance has not been brought about by fear of typhus, but it has resulted in the diminishing of the risk of typhus outbreaks in England. Yule goes on to point out that good water supplies, freedom from animal parasites and many other desirable hygienic conditions are a part of good living and probably would be perpetuated even in the absence of hygienic rationalizations.

An important mode of action of good housing, and also of smaller family size, is in raising the age of infection. This is of special importance in measles and pertussis. In general the case fatality of the infective diseases is less with increasing age and, for example, is negligible for pertussis after the second year. The mortality rates which are studied in this paper are the products of the incidence (notification) rate and the case fatality rate. However, this raising of the age at infection has led to unfavourable results in some diseases, notably poliomyelitis (Burnet, 1952), hepatitis and mumps. The age incidence is studied with difficulty in Australia owing to the lack of interest in notification. Jungfer (1956) is glad to see the passing of the notification system, but desires some perhaps voluntary notification system among medical practitioners. It is doubtful whether such alternatives are practicable. The older system of notification, still found useful and informative in England and Wales, has broken down in Australia, chiefly because of lack of interest and the relative absence of any application of the results by public health workers, so that the medical practitioners do not regard notifications as a moral duty, nor do the authorities responsible feel that either incentives to regular notification or disciplinary action are justified.

This reduction in mortality from the infective diseases in childhood has not always been regarded as a blessing. Many fears have been expressed that with the relaxation of the selection pressure of the infections, an unfit generation will arise. It was once confidently believed that if the death rate was low in infancy and early childhood it would be high in later childhood and adult life. These views have often been expressed in discussions on mortality published in the *Journal of the Royal Statistical Society*. Consideration of the mortality on a generation basis reveals that this effect does not follow for total mortality. Consideration of diseases which are characterized by a solid immunity, such as measles, reveals that delay in the age of infection may ensure that a generation has a few deaths at higher ages rather than a great number of deaths in infancy. However, there is little advantage to a child to have passed through an attack of gastro-enteritis at a younger age, since it confers no immunity. It is, therefore, now usually the custom to transfer the argument from a discussion of a single generation to a genetical discussion of the effects on future generations, using arguments along Darwinian lines (Darwin, 1859). It is not remarkable that opponents of public health measures are able to find suitable arguments in Darwinism, for as Rádl (cited by Nordenskiöld, 1936) has pointed out:

> Darwin really applied the social conception of contemporary liberalism to life in nature; which, as a matter of fact, is at once realised from the acknowledged part played by Malthus' social doctrine in the working-out of Darwin's theory.

It may be that the genetical aspect has been over-stressed, for it may well be argued that the bacterial and viral diseases now common in the human population could have hardly been maintained in a scattered population, such as in the Stone Age. For example, measles, diphtheria, whooping-cough and rubella have great difficulty in maintaining themselves if the population is split into small "isolates" with relatively little communication between them. It is possible that such diseases were rarities in any prehistoric communities. Indeed, in countries such as England, with large urban aggregates, their epidemiology is quite different from that noted in the "isolated" countries.

This decline in the mortality of childhood in Australia is part of a general decline throughout the world. Peller (1943 and 1948), in his survey of the mortality of the ruling families of Germany, points out that there was

probably a rise in the mortality of early childhood between the seventeenth and eighteenth centuries, but a great reduction began in the years around 1800. He gives, as mortality rates for children at ages one to four years in these ruling families, 12·3 per thousand in the seventeenth century, 13·3 in the eighteenth century, 3·7 in the years between 1850 and 1900, and 1·1 in the years from 1900 to 1930. It is perhaps fair to say that some time after 1750 the mortality rates began to fall in such countries as Sweden, and that declines began in other countries at a somewhat later date, depending on special conditions in the country. New Zealand death rates at this age have been consistently lower than those in Australia and the rest of the world. A brief comparison of mortality rates for certain countries is made in Figure IV. It is easily seen that although Australia had more favourable rates than England and Wales at the beginning of the century, this advantage has been lost.

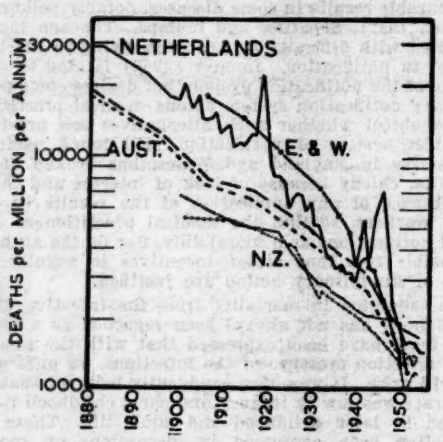

FIGURE IV.

Some international comparisons of the mortality in early childhood at ages one to four years. E. and W. = England and Wales; N.Z. = New Zealand; Aust. = Australia. The death rates of the two sexes are shown separately for Australia and New Zealand, the upper curve in each case being that of the males.

SUMMARY.

Pronounced declines have occurred in the mortality of early childhood in Australia since about 1880. These declines are due largely to reductions in the mortality from the infective diseases and from diseases of the respiratory system. After being one of the first countries to enjoy these declines in mortality, Australia has now less favourable mortality rates at these ages than several other countries, including New Zealand and England and Wales.

ACKNOWLEDGEMENTS.

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REFERENCES.

BOYD, J. S. K., and MACLENNAN, J. D. (1942), "Tetanus in the Middle East: Effects of Active Immunisation", *Lancet*, 2: 745.

BURNET, F. M. (1952), "The Pattern of Disease in Childhood", *Australasian Ann. Med.*, 1: 93.

CLEMENTS, F. W.: for references see Lancaster, 1956.

DARWIN, C. R. (1859): "The Origin of Species by Means of Natural Selection".

GREENWOOD, M. (1936), "English Death Rates, Past, Present and Future: A Valedictory Address", *J. Roy. Statist. Soc.*, 99: 674.

GREENWOOD, M. (1935), "Epidemics and Crowd Diseases", Williams and Norgate, London.

JOHNSON, D. W. (1956), "Control of Infectious Disease", M. J. AUSTRALIA, 1: 123.

JUNGNER, C. (1956), "Control of Infectious Disease in a Rural Community", M. J. AUSTRALIA, 1: 129.

LANCASTER, H. O. (1950*a*), "Tuberculosis Mortality in Australia, 1908 to 1945", M. J. AUSTRALIA, 1: 655.

LANCASTER, H. O. (1950*b*), "Tuberculosis Mortality of Childhood in Australia", M. J. AUSTRALIA, 1: 760.

LANCASTER, H. O. (1951), "Mortality from Congenital Malformation in Australia", M. J. AUSTRALIA, 2: 318.

LANCASTER, H. O. (1952*a*), "The Mortality in Australia from Acute Infective Disease", M. J. AUSTRALIA, 1: 175.

LANCASTER, H. O. (1952*b*), "The Mortality in Australia from Measles, Scarlatina and Diphtheria", M. J. AUSTRALIA, 2: 272.

LANCASTER, H. O. (1953), "The Mortality from Tetanus in Australia", M. J. AUSTRALIA, 2: 417.

LANCASTER, H. O. (1955), "The Mortality in Australia from Leuchæmia", M. J. AUSTRALIA, 2: 1064.

LANCASTER, H. O. (1956*b*), "Infant Mortality in Australia", M. J. AUSTRALIA, 2:

MCLORINAN, H. (1956), "The Control of Infectious Disease with Special Reference to the Role of the Hospital", M. J. AUSTRALIA, 1: 121.

NORDENSKIÖLD, E. (1936), "The History of Biology" (translated from the Swedish), page 470, Tudor Publishing Co., New York.

PELLER, S. (1943), "Studies on Mortality Since the Renaissance", *Bull. Hist. Med.*, 13: 429.

PELLER, S. (1948), "Mortality, Past and Future", *Population Studies*, 1: 457.

RUTSTEIN, D. D., NICKERSON, R. J., and HEALD, F. P. (1952), "Seasonal Incidence of Patent Ductus Arteriosus and Maternal Rubella", *Am. J. Dis. Child.*, 84: 199.

Studies I and II (1954), "Fœtal, Infant and Early Childhood Mortality", Volume I: The Statistics, Volume 2: Biological, Social and Economic Factors, Population Studies, Number 13, United Nations, New York.

VAN GELDEREN, H. H. (1955), "Pre-School Child Mortality in the Netherlands", Publication Number 28 of the Netherlands Institute for Preventive Medicine.

WRIGHT, G. P. (1954), "Tetanus", *Brit. M. Bull.*, 10: 59.

Reports of Cases.

LEPTOSPIROSIS POMONA: CASE REPORT.

By J. M. DUGGAN,
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AND
W. F. HUNTER,
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Royal Newcastle Hospital, Newcastle, New South Wales.

IN 1934 Cotter and Sawers isolated a leptospira during an epidemic of so-called "coastal fever" in the Ingham area of Queensland, and in 1937 G. F. Lumley showed that these infections were due to *Leptospira australis* A and B; they have since been shown to be acute infections almost confined to canefield workers.

Simultaneously Clayton and Derrick demonstrated that a case of "seven day fever" was due to a different strain of Leptospira distinguished by its lower virulence, and called it *L. pomona*, from the town where it was first isolated. Since then this organism has been shown to have a much wider distribution.

Johnson (1950) reported 105 cases of infection with *L. pomona*, distributed in southern Queensland and northern New South Wales, and referred to their occurrence in Perth, Western Australia. At that time he thought it "probable that ultimately the mild Leptospiroses will be found to have a much wider distribution than is known at present". This prediction was borne out by the discovery that leptospiroses were endemic among dairy farm workers in east Gippsland, Victoria (Wellington, Stevenson and Forris, 1951). Stevenson *et alii* in 1953 presented evidence to show that 7·6% of workers in the metropolitan abattoirs of Melbourne had serological evidence of previous infection with the mild leptospiroses—*L. pomona* and *L. mitis*. They also showed that three cases of acute aseptic meningitis in Melbourne were due to infection with *L. pomona*. So far as we are aware, no cases of *L. pomona* infection have

been reported in New South Wales outside the northern rivers area.

Clinical Record.

The present case is that of a male of thirty years employed as a labourer at the Newcastle abattoirs, who was admitted to hospital on March 10, 1955, with the history of the sudden onset, six days previously, of malaise, anorexia, nausea, vomiting, rigors and frontal headache. Shortly afterwards he noticed that all his joints were aching and that his neck was stiff and sore. He also complained of intermittent blurring of vision and of cough and sputum. These symptoms persisted with moderate severity until the day before his admission to hospital, when he felt fairly well, but on the day of his admission there was a sudden recurrence of symptoms. The headache was mainly frontal and appeared to be aggravated by light and coughing. It occurred when the patient sat up and it was accompanied by vertigo. He gave a history of "virus 'flu" years earlier.

On examination of the patient, his temperature was 102° F., his pulse rate was 116 per minute, and his respirations numbered 24 per minute. The urine was normal to the ward test. The patient obviously had severe headache and vomited at intervals. There was a morbilliform rash over the upper three-quarters of the trunk and the upper parts of the arms, which had previously been unnoticed by the patient. Examination of the central nervous system revealed moderately severe neck stiffness and spine stiffness, and Kernig's sign was elicited; the tendon reflexes were somewhat exaggerated; otherwise no abnormality was found. Some conjunctival injection and photophobia were present. In the hæmatopoietic system there were moderately enlarged and tender lymph nodes in the axilla and groin, and the tip of the spleen was palpable below the left costal margin and was tender. There was no objective evidence of changes in the painful joints, and the other systems were normal. Lumbar puncture revealed clear cerebro-spinal fluid under a pressure of 250 millimetres of cerebro-spinal fluid; the fluid contained 32 red blood cells per cubic millimetre. The protein content was 66 milligrammes per cubic centimetre, the chloride content was 680 milligrammes per cubic centimetre, and sugar was present. The fluid was sterile on attempted culture.

Symptomatic treatment only was given, and on the next day the patient felt better, the headache had gone and the conjunctival injection was more obvious. The temperature fell to normal on the second day after his admission to hospital and remained so until his discharge one week later.

A number of investigations were carried out. A full blood count gave the following information: the hæmoglobin value was 14·4 grammes per cubic centimetre; the red cell count was 4,200,000 per cubic millimetre; the white cell count was 6350 per cubic millimetre, 62% being neutrophile cells, 26% small lymphocytes, 2% large lymphocytes, 9% monocytes and 1% eosinophile cells. The blood was sterile on attempted culture. An X-ray examination of the chest gave normal results. Agglutination tests showed no serological evidence of infection with typhoid, paratyphoid, typhus or scrub typhus.

When he was examined two weeks after his discharge from hospital he was well. Serum taken on the day after his admission and three weeks later was examined at the Laboratory of Microbiology and Pathology, Brisbane. The results are shown in Table I.

The inference drawn is that the present illness was due to *L. pomona*, and there was evidence of previous infection with "Q" fever and brucellosis.

Discussion.

This patient appears to present many of the typical features of *L. pomona* infection previously described, in particular the rapid onset of headache, prostration, generalized pain, joint pains, signs of meningeal irritation and conjunctival injection with photophobia. The relapse which led to his admission to hospital occurs in two-thirds of cases (Johnson), most commonly on the seventh day, and the duration of the illness and the rapid recovery are typical.

Johnson has drawn attention to the predominance of the illness amongst workers handling cattle and pigs on farms or in abattoirs, and it is thought that this case bears out his contention that the disease may be more widespread than is realized.

TABLE I.

Antigen.	Antibody Titre: Reciprocals.	
	Specimen I.	Specimen II.
Leptospira pomona	100	3000
Brucella abortus	128	128
Coxiella burnetii	16	16

Acknowledgements.

We are indebted to the Laboratory of Microbiology and Pathology, Brisbane, for the serological investigations for leptospiral, rickettsial and brucella infections in this case, and to Dr. R. M. Gibson, under whose care the patient was admitted to hospital, for permission to publish this case.

References.

CLAYTON, G. E. B., DERRICK, E. H., and CILENTO, R. (1937), "The Presence of Leptospirosis of a Mild Type (Seven-day Fever) in Queensland", M. J. AUSTRALIA, 1: 647.

COTTER, T. J., and SAWERS, W. C. (1937), "Laboratory and Epidemiologic Investigations of the Outbreak of Weil's Disease in North Queensland", M. J. AUSTRALIA, 2: 597.

JOHNSON, D. W. (1950), "The Australian Leptospiroses", M. J. AUSTRALIA, 2: 724.

LUMLEY, G. F. (1937), "Leptospirosis in Queensland: A Serological Investigation Leading to the Discovery of Distinct Serological Groups of Leptospiræ causing Leptospirosis, as It Occurs in Northern Queensland, with Some Other Related Observations", M. J. AUSTRALIA, 1: 654.

STEVENSON, W. J., HAYES, L., FERRIS, A. A., and WELLINGTON, N. A. M. (1953), "Observations on Leptospirosis in Victoria", M. J. AUSTRALIA, 1: 770.

WELLINGTON, N. A. M., STEVENSON, W. J., and FERRIS, A. A. (1951), "Endemic Leptospirosis in Victoria", M. J. AUSTRALIA, 2: 15.

Reviews.

The Recovery Room: Immediate Postoperative Management. By Max S. Sadove, M.D., and James H. Cross, M.D., with contributions by 24 authorities; 1956. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 9½" x 6", pp. 618, with illustrations. Price: £6.

THIS book has been compiled by a number of contributors, each a specialist in his own field. The authorities range from professors of surgery, including most of the specialized departments, such as oto-rhino-laryngology, neurosurgery, ophthalmology and obstetrics, to the head nurse of a recovery room.

One gains the impression that the book is intended primarily as a *vade mecum* for the guidance of anybody contemplating the building of a hospital, for anybody intending to run it as an administrator, or for anybody intending to live in it as a resident medical officer. Many subjects are touched upon lightly; nothing is dealt with at very great depth (with the possible exception of the voluminous lists of trays and equipment on the various shelves of the head nurse's cupboards).

The scope of the book covers the post-operative care of almost every surgical patient; it is, therefore, limitless. However, one feels that a great deal more could have been said about the treatment of shock and the management of blood transfusion and electrolytic balance, and less about the general pharmacology of drugs; that more could have been said about post-operative complications, such as hæmorrhage, peritonitis and paralytic ileus, which are all covered in a total of three pages, while the catalogue of equipment in the recovery room is given greater space. Although the Levin tube, the Harris tube and the Miller-Abbott tube are described and illustrated, Wangensteen's name has been omitted from the index.

It would seem that the book loses a little in having so many contributors. There is some overlapping, and there are notable omissions. Generally, the book is readable and worth its place on the bookshelf of the "recovery room" itself, if only for the guidance of the junior resident or nurse under conditions of stress.

Sir John Bland-Sutton, 1855-1936. By W. R. Bett, M.R.C.S. (England); foreword by Lord Webb-Johnson; 1936. Edinburgh and London: E. and S. Livingstone, Limited. 8¼" × 6¼", pp. 108, with illustrations. Price: 20s.

ALTHOUGH the general background and character of Sir John Bland-Sutton may not appeal forcefully to some uncompromising idealists, it must be admitted that the variety of his interests, with the irresistible urge to exploit thoroughly so many different sidelines quite apart from his regular vocation, is truly indicative of that genius which also found practical expression in his surgical and administrative work. An illuminating biographical sketch of this eminent London surgeon, still remembered for his writings on operative techniques in the gynæcological field, is ably presented by Dr. W. R. Bett with the help of a fluent and precise literary style.

From a start well behind scratch, Bland-Sutton quite early in life set out upon a marathon course designed to reach the pinnacle of fame—which is all greatly to his credit, even though it may seem a trifle unrefined. His innate gifts as a disciplined thinker, a systematizer of knowledge, a naturalist, an artist and a fine surgical craftsman, all played their part in his final achievement of that life-long ambition. However, in spite of the inevitable irritations and antagonisms which in those days threatened the purest intentions and disturbed the equanimity of any successful rival in the professional arena, Bland-Sutton remained serenely impervious to unjust criticism, and continued to form firm and lasting friendships with kindred spirits from all walks of life.

This small book, which has a foreword by Lord Webb-Johnson, is recommended to all surgeons and gynæcologists for study, entertainment and enlightenment.

Notes on Books, Current Journals and New Appliances.

Family Doctor. Published monthly by the proprietors, the British Medical Association, Tavistock Square, London, E.C.1. Sole agents for Australia and New Zealand: Gordon and Gotch (Australia), Limited. Subscription for twelve months: 20s. (sterling), including postage.

THE September and October issues of *Family Doctor* come up to the best standards as measured by the yardstick of informed common sense. The regular features are there, including the Under Five Forum, with lots of helpful advice on looking after infants, and the Home Service Supplement, with various articles on designing and looking after the home, cooking, dress patterns for mother and child, and so on. A well-balanced article on keeping poliomyelitis in perspective in the September issue is followed by a discussion on the use of poliomyelitis vaccine in the October issue. A large number of other articles present things that most doctors wish their patients to know in a way that will appeal to the lay person, and there is much that doctors and their families will find interesting reading for themselves. Two unusual short articles in the September issue require honourable mention: in "Fresh Air is a Bad Thing", Jones Minor presents the schoolboy's point of view in an amusing fashion; "Like Captured Fireflies", by John Steinbeck, goes right to the heart of what constitutes good teaching.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Essential Urology", by Fletcher H. Colby, M.D.; Third Edition; 1956. London: Baillière, Tindall and Cox. 9¼" × 6¼", pp. 666, with 358 illustrations and 10 tables. Price: 64s.

The first edition was published in 1950.

"Rosenau: Preventive Medicine and Public Health", by Kenneth F. Maxcy, M.D., Dr.P.H., with 27 contributing authors; Eighth Edition; 1956. New York: Appleton-Century-Crofts, Incorporated. 10" × 6¾", pp. 1480, with many illustrations.

Previous editions had the title "Rosenau: Preventive Medicine and Hygiene". In this edition the work has been extensively revised and partly rewritten.

"Internal Medicine: A Physiologic and Clinical Approach to Disease", by Robert P. McCombs, B.S., M.D., F.A.C.P.; 1956. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 727, with illustrations. Price: $10.00.

"This volume comprises a summary of the most important clinical facts, physiological concepts, diagnostic methods, and therapeutic measures of use in the study and management of internal diseases."

"Borderlands of the Normal and Early Pathologic in Skeletal Roentgenology", by Professor Dr. Alban Köhler; Tenth Edition, completely revised, with reference to illustrations and to text by Dozent Dr. E. A. Zimmer; English translation arranged and edited by James T. Case, M.D., D.M.R.E. (Cambridge); 1956. New York and London: Grune and Stratton, Incorporated. 10½" × 6¾", pp. 741, with 1300 illustrations. Price: $24.50.

A standard reference volume for radiologists. The first German edition was published in 1910, the first English edition in 1928.

"An Introduction to Dermatology", by G. H. Percival, M.D., Ph.D., F.R.C.P., D.P.H.; Twelfth Edition; 1956. Edinburgh and London: E. and S. Livingstone, Limited. 8¼" × 5¼", pp. 382, with 256 illustrations, 188 in full colour. Price: 45s.

The first edition was published more than half a century ago.

"Radiology of the Alimentary Tract in Infancy", by Roy Astley, M.B., M.R.C.S., D.M.R.; 1956. London: Edward Arnold (Publishers), Limited. 9¼" × 6", pp. 295, with illustrations. Price: 50s.

This book is written primarily for the radiologist and radiologist-trainee, but the author hopes that it may also prove useful to both pædiatrician and pædiatric surgeon.

"Rest and Pain", by John Hilton, F.R.S., F.R.C.S.; edited by E. W. Walls, M.D., Ch.B., B.Sc., and Elliot E. Philipp, M.A., M.B., B.Chir., F.R.C.S., M.R.C.O.G., in collaboration with H. J. B. Atkins, D.M., M.Ch., F.R.C.S.; Sixth Edition; 1953. London: G. Bell and Sons, Limited. 8¼" × 5¼", pp. 539, with illustrations. Price: 25s.

A modern edition of a surgical classic first published in 1863.

"An Atlas of Diseases of the Eye", compiled by E. S. Perkins, M.B., F.R.C.S., and Peter Hansell, M.R.C.S., F.R.P.S., with a foreword by Sir Stewart Duke-Elder, K.C.V.O., M.A., D.Sc., Ph.D., M.D., F.R.C.S.; 1957. London: J. and A. Churchill, Limited. 10¼" × 8¼", pp. 101, with illustrations in colour. Price: 42s.

The volume is intended to provide the student, the general practitioner and the non-ophthalmological specialist with a short guide to the more common and important ocular disorders.

"The Medical Clinics of North America", Nationwide Number, with 40 contributors; September issue; 1956. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 9" × 6", pp. 321, with illustrations and tables. Price: Paper binding £6 15s., cloth binding £8 2s. 6d.

Contains a symposium of 19 articles on specific methods of treatment.

"The Labyrinth: Physiology and Functional Tests", by Joseph J. Fischer, M.D.; 1956. London and New York: Grune and Stratton, Incorporated. 9" × 6", pp. 217, with illustrations. Price: $6.00.

The author aims to emphasize the clinical aspects of the various labyrinthine functions while showing their relation to the theoretical background.

"Alcoholism: A Manual for Students and Practitioners", by Lincoln Williams, M.R.C.S., L.R.C.P.; 1956. Edinburgh and London: E. and S. Livingstone, Limited. 8¼" × 5¼", pp. 72. Price: 8s. 6d.

The purpose of this book is to stimulate interest in alcoholism—its etiology, diagnosis and treatment.

The Medical Journal of Australia

SATURDAY, DECEMBER 15, 1956.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

FAT EMBOLISM.

ONE of the most serious complications of trauma to long bones, either accidental or surgical, is the release into the vascular system of large amounts of fatty material which may, eventually, find their way into and block a vital blood vessel. Only the more severe degrees of fat embolism are recognized clinically. The condition is particularly liable to occur after fracture of the tibia or femur in obese and elderly subjects, but young and fit persons form a large proportion of those affected by it. The onset is invariably rapid, and usually occurs on the second day after trauma, and the signs and symptoms are those of an embolism of the pulmonary or cerebral vessels. Death may occur with dramatic suddenness. In those patients who survive, fat may be found in the sputum and the urine. The actual mechanism whereby fat is liberated into the venous system is probably more complex than can be explained by the simple breakdown of natural barriers at the site of trauma. Examination *post mortem* reveals multiple fat emboli scattered throughout the vital organs. E. S. James[1] suggests that males are more commonly affected in the ratio of 8:1 because they are more liable to trauma. Prevention of such catastrophes should be by the careful handling of fractures, with early immobilization, and by the use of a tourniquet in orthopædic operations. J. P. Wyatt and P. Khoo,[2] in a consecutive series of 30 subjects who died soon after trauma, discovered in every one considerable quantities of intravascular pulmonary fat. The same changes were not found either in individuals who died suddenly from traumatic causes or in subjects who died after a lingering illness. Wyatt and Khoo suggest that the degree of emulsification, rather than the amount of fat, is the important factor in the widespread blocking of the vascular channels.

However, attempts to reproduce in animal experiments the effects of gross pulmonary fat embolism have not met with great success. J. Armin and R. T. Grant[3] found that rabbits injected with 0·15 millilitre of fat per kilogram of body weight, by the intravenous route, remained quite undisturbed and well, despite the histological demonstration of the same changes in the lungs as are found after death from pulmonary fat embolism in man. Similarly hæmorrhage did not increase the dangers of fat in the lungs, and death, in rabbits treated both by the injection of fat and by the letting of blood, could be related only to the hæmorrhage. Armin and Grant suggested that gross pulmonary fat embolism in man was "unlikely to cause obvious symptoms or to be alone or in part responsible for death". A far more grave view of the consequences of fat embolism is taken by M. M. Musselman *et alii*,[3] who consider that the phenomenon is likely to be encountered in one-half of all persons either moderately or severely injured. Further, of those in whom fat embolism occurs, one-third will develop significant symptoms and 10% will die as a result of it. Several of their patients with no head injury had signs of cerebral disturbance attributable to fat embolism after body injury. A. J. Alldred[3] also takes a serious view of this complication of fracture, though he is not able to substantiate the view taken by Musselman *et alii* that free fat is usually found in the urine when fat embolism occurs. Alldred, in a series of nine cases, was most impressed by the frequent finding of central neurological signs with sudden incontinence of urine. In addition to the familiar pulmonary signs, most of the patients developed a petechial rash over the chest and shoulders, and death occurred in three cases.

American workers still continue to lay stress on the importance of free fat in the urine as the sign of fat embolism after injury. W. W. Glas *et alii*[4] suggest that treatment of fat embolism may successfully be carried out by the use of appropriate emulsifying agents. The results of their experiments in rabbits were rather inconclusive, though, in view of the findings of Armin and Grant, the suitability of the rabbit for experiments designed to simulate human fat embolism is to be doubted. However, this may be partially explained from the experiments of R. L. Swank and G. S. Dugger.[5] These authors found that, after bone trauma to rabbits, the fat emboli were sufficient to cause pathological changes in the brain after having apparently passed through the lungs owing to the reduction of the vascular tone induced by shock.

From his experiments with the rat, H. J. Whiteley[6] has concluded that there is a dual relationship between tissue

[1] *Canad. M. A. J.*, June, 1950.
[2] *Am. J. Clin. Path.*, July, 1950.
[1] *Clin. Sc.*, November, 1951.
[2] *Arch. Surg.*, October, 1952.
[3] *Brit. J. Surg.*, July, 1953.
[4] *Am. J. Surg.*, March, 1953.
[5] *Surg., Gynec. & Obst.*, June, 1954.
[6] *J. Path. & Bact.*, April, 1954.

injury and fat embolism. Minor degrees of pulmonary embolism may occur, quite apart from tissue injury, and Whiteley suggests that the liver may be the source of small fat emboli. Muscle ischæmia in rats increases the effect upon the general condition of pulmonary fat emboli; and it may be that injury itself modifies the pulmonary vascular bed and that this results in increased sensitivity to the presence of intravascular fat.

As fat embolism is associated primarily with trauma, it is obvious that cases will occur particularly under wartime conditions. Consequently a study was made of this particular abnormality during the Korean War, and R. E. Scully[1] has commented on the results. Study was made of 110 subjects who died within four weeks of injury and whose average age was twenty-two years. One-quarter of the subjects had died within less than twenty-four hours. Routine staining of lung sections revealed that fat emboli were present in 87 cases; even more cases were discovered by special staining techniques. Of the 110 subjects, the degree of pulmonary fat embolism was marked to moderate in 19%. Fat emboli were found in subjects who had lived only for a few minutes after the original injury, but the pulmonary fat content was, on an average, higher in those who survived the first day but died in the early part of the first week. The recognition of fat emboli was found to be easiest in the kidneys; 92% of the subjects were found to have little or no fat embolism in the kidneys. Study of the subjects in whom the pulmonary changes were fairly marked revealed that only five of twenty-four subjects had fat in the brain, an incidence even less than the frequency of renal changes. An attempt to correlate the pathological findings with the degree of injury revealed that the degree of fat change was roughly proportional to the degree of trauma sustained. In 18 subjects who died after extensive burns, slight or moderate degrees of fat embolism were found in three. Fat embolism was more common in patients who had received damage to the extremities involving skeletal tissue. However, the highest incidence and the most severe grades of fat embolism were found in 13 subjects who had been severely beaten prior to death; this suggests the importance of trauma to adipose tissue in the production of fat embolism. An attempt to correlate the clinical findings before death with the pathological findings at autopsy was unsuccessful. Dyspnœa and cyanosis were not related to the degree of pulmonary fat; neither was the degree of shock related to the pulmonary abnormality. The occasional occurrence of unexpected sudden death could not be related to the quantity of embolic fat in the lungs. Cutaneous petechiæ were noted occasionally. Ophthalmoscopic and urinary investigations were not made before death. Two patients had presented with clinical signs of cerebral fat embolism, but autopsy revealed only cerebral œdema in one of these. Pulmonary œdema was not related to the pulmonary emboli. In four cases, bone marrow emboli were found in the pulmonary arteries; a common finding was the presence of fibrin thrombi. Microscopic evidence did not lend support to the belief that pulmonary fat emboli cause focal œdema, hæmorrhage, emphysema or atelectasis. The presence of fat droplets in the alveoli was unusual. Although fat emboli were found scattered throughout many organs, only in the brain were there degenerative parenchymal lesions secondary to fat embolism. It is of particular interest that Scully was unable to attribute such features as respiratory embarrassment to fat emboli, nor did it seem likely that fat embolism was the primary cause of death, with very occasional possible exceptions. This conclusion bears out the experimental findings of Armin and Grant. Two important points emerge which are at variance with previous work. On the one hand it would appear that fat emboli, usually pulmonary, are a very common accompaniment to any tissue injury, and on the other hand the importance of fat emboli may previously have been much overrated.

[1] *Am. J. Path.*, May-June, 1956.

Current Comment.

ANÆSTHETIC EXPLOSIONS.

In a special abstract in this journal some three years ago,[1] we presented the main details from a bulletin on static electricity in hospitals, issued by the Bureau of Mines, Department of the Interior, United States of America. In this it was pointed out that many of the gases and vapours used in anæsthesia form explosive mixtures with oxygen or air, and that today the chief causes of ignition for these mixtures are electrical. The comment was made that fires and explosions were still much too frequent, and because many of the mixtures were rich in oxygen, the explosions sometimes were very violent. Attention was drawn to the importance as a source of ignition of static electricity, the hazard from which had until quite recently not even been suspected in a large majority of anæsthetizing areas. The bulletin went on to explain the sources of this static electricity and to present practical ways in which the danger could be overcome.

The subject has again been brought into prominence by a recent report on anæsthetic explosions,[2] in which it is pointed out that, although not many such explosions do occur, most, if not all, of them could be prevented, and static electricity is by far the most important source of ignition. The report is that of a working party set up by the Ministry of Health in the United Kingdom, under the chairmanship of Professor Gilbert Stead. Its task was to consider the causes of anæsthetic explosions in hospitals and to make recommendations for their prevention. The working party reached the conclusion that there was room for further research into many of the problems connected with anæsthetic explosions and their prevention, but there is much in the report which is of immediate value

The working party was able to obtain histories of 36 explosions occurring between the middle of 1947 and the middle of 1954. They also found that the number of occasions on which anæsthetics were used over a year in Britain was of the order of two and three-quarter millions; on about 860,000 of these occasions, explosive anæsthetics were used. As the report points out, these figures do not render any less unhappy the 36 accidents which have to the working party's knowledge occurred, but they do help to show the accidents in a proper perspective. The report sets out the anæsthetics and combinations of anæsthetics used when the accident occurred, but comparison of these figures is of little value without our knowing the relative frequency of use of these anæsthetics and combinations of anæsthetics. More significant is the fact that of the 36 explosions the probable source of ignition was static spark in 22 cases; the other probable sources were static spark or open gas burner (1), static spark or electric heater (1), static spark or smouldering towel (1), diathermy (5), spark in switch or cut-out (3), faulty valve in gas cylinder

[1] M. J. AUSTRALIA, February 20, 1954.

[2] "Report of a Working Party on Anæsthetic Explosions including Safety Code for Equipment and Installations"; Ministry of Health; 1956. London: Her Majesty's Stationery Office. 6" × 9¼", pp. 40. Price: 2s. 6d.

(1), foreign matter in valve (1), and smoking (1)—the last source was considered doubtful. The working party believe that the 36 anæsthetic explosions of which they have obtained histories include most of the major accidents of this type which have occurred in the period under review; so that the main causes of the explosions are static electricity and (a long way behind) diathermy.

The working party was impressed by the fact that almost always when an accident occurred there had been some avoidable factor against which precautions could have been taken. One of the chief difficulties to be overcome was the lack of any general consciousness of danger; but the report points out that if every hospital would take simple precautions of the type already observed as a routine wherever any thought has been given to this matter, three-quarters of the problem of anæsthetic explosions would disappear. In considering what routine precautions should be taken the report refers first of all to the prevention of explosions other than those caused by static discharge. It is stated that some accidents arise through sparking from defective apparatus or from pieces of equipment not obviously dangerous. It is recommended that electrical equipment *et cetera* should be constructed and placed so as to avoid sparking or heating near the anæsthetic apparatus, and an appendix to the report presents a safety code for apparatus used in such a position. An interesting side comment made by the working party is that the fear of a spark may lead anæsthetists to use a physiologically dangerous drug rather than an explosive one. This somewhat paradoxically means that the avoidance of the explosive hazard involves the acceptance of another hazard which could be greater. Sometimes this is necessary, but the report expresses the view that the risk of an explosion in a modern X-ray room is easy to exaggerate and that the great majority of explosions not attributed to static sparks are readily preventible by careful observance of the precautions suggested.

Turning to the question of the prevention of explosions caused by static electrification, we would remind readers of the bulletin referred to at the beginning of this comment as well as the safeguards suggested in the working party's report. The latter are summed up under four headings: the use of antistatic rubber, which should be introduced as quickly as possible; the use of conducting footwear and outer clothing; the installation of suitable floors (where they are not suitable they should be made wet); the maintenance of a high relative humidity. Considerable difficulty still remains in implementing the last two of these provisions, and further research is needed. The working party has also had under consideration a piece of apparatus which, it is suggested, might be installed in operating theatres, for the specific purpose of minimizing the risk of static discharges. The apparatus is designed to ionize the air in its neighbourhood by circulating it over a radioactive thallium source. At present it is still in the experimental stage, but it offers possibilities. Another important line of approach, still in the experimental stage, is the development of substitutes for explosive gases. This, it must be agreed, is the only completely satisfactory answer likely to be obtained to the explosion problem, and it is encouraging to note that useful progress in this direction has been made. The most hopeful possibilities seem to lie in the use of fluorine-substituted compounds analogous to existing anæsthetics. In a recent annotation in *The Lancet*,[1] reference is made to a new British product, a halogenated hydrocarbon known as "Fluothane", which is stated to be non-explosive and non-inflammable when mixed in high concentration with oxygen. Furthermore it is described as a potent drug with few toxic effects. This drug has been undergoing extensive clinical trial for a considerable time; it is to be hoped that if and when it is released for general use, it will prove an important asset in the anæsthetic field. The working party's report, in a special note on risks in dental departments, mentions the fact that to the best of the working party's knowledge, no explosions have occurred during ordinary dental procedures in recent years, but risks are present, and in this field attention may well be paid to the recommendations of the report if a potential hazard is not to become an actual one.

The report concludes on a realistic note. It is pointed out that though the problem is a very real one, the working party has no wish to exaggerate its importance, and for that reason has sought to be moderate in its recommendations. It is appreciated that hospital authorities will rightly hesitate to adopt measures which conflict with clinical requirements, or even clinical convenience, or which involve heavy expenditure. Nevertheless, it is important that there should be a more general awareness of the danger, and a realization that since 1947 three patients have died and a number of people have sustained injuries as a result of anæsthetic explosions. There are thus no grounds for complacency. As the report states, anæsthetists should not need to be reminded that they must not smoke at their work, nor hospital authorities that they must not site gas burners near where inflammable anæsthetics are used. But astonishingly enough these things still do happen, and until people can be made conscious of the danger, little is to be gained by developing refinements in the recommended technique. The matter is undoubtedly one for tactful education, and some good may follow the display of a notice such as the one suggested in an appendix to the report. However, human nature being frail, a more reliable solution to the problem is likely to come from effective research along one or other of the four lines which the working party has commended to the attention of the Minister for Health. The aspects mentioned are four: (*a*) finding a means of increasing the conductivity of existing non-conductive floors in anæsthetizing locations; (*b*) finding a means of adjusting the relative humidity of anæsthetizing locations; (*c*) investigating the efficiency and safety of ionizing the air as a means of preventing static discharges; (*d*) developing the use of new non-explosive drugs as anæsthetic agents.

[1] *Lancet*, October 20, 1956.

SINGLE BREATH TESTS OF VENTILATORY FUNCTION.

Now that single breath tests of ventilatory function are a routine clinical procedure in many chest clinics abroad, it is unfortunate that the technique and terminology have not been standardized. Basically all the tests depend upon the introduction of a time factor into a recording of vital capacity performed by a maximal forced expiration after a full inspiration. D. Gross,[1] in 1943, suggested that the time taken to complete the vital capacity manœuvre should be noted; but this is too variable and insensitive, although it is prolonged in a host of cardio-pulmonary disorders. Subsequent modifications have depended on the measurement of the volume of air expired in a fixed period of time from the beginning of the fast expiration. R. Tiffeneau[2] in France and E. A. Gaensler[3] in America adopted the first second for various reasons; this remains the most commonly used test of this type. M. C. S. Kennedy,[4] working at the Pneumoconiosis Research Unit at Cardiff, advocated the use of the volume expired in the first 0·75 second, essentially because its results correlated well with those of the maximum breathing capacity test. The latter test is more cumbersome, but its value has become widely appreciated since its introduction over twenty years ago. Unfortunately it is for this reason that it has been used as a yardstick by which to assess the results of the single breath tests; the absolute value of the latter has been obscured by attempts to convert it into an indirect estimate of the maximum breathing capacity by multiplying by a more or less arbitrary factor (approximately 35 in the case of the one second expiratory volume measurement).

[1] *Am. Heart J.*, 1943, 25: 335.
[2] *Paris méd.*, 1947, 133: 624.
[3] *Am. Rev. Tuberc.*, 1951, 64: 256.
[4] *Thorax*, 1953, 8: 73.

This has been justified by some rather tenuous theoretical considerations, but more particularly by the view that clinicians are accustomed to thinking in terms of litres per minute rather than millilitres per second. On the other hand, clinicians have adapted themselves remarkably well to many more radical changes in recent years, and it is by no means inconceivable that they would do so for a change which would replace an intelligent guess by a direct observation. Be that as it may, respiratory physiologists are to blame for further directing attention away from the significance of absolute values for this test by expressing their results as percentages of something else, the total vital capacity, for example, or as a ratio of some kind. This is not to deny the value of these mathematical expressions of reasonably simple mental processes, but merely to resent the implied reliance on a single figure which can be influenced by either of the two variables from which it is derived. Thus, it is readily admitted that if the one second expired volume is divided by the total vital capacity, one has a useful index of bronchial obstruction. Its empirical nature is emphasized, however, by the curious fact that in spite of its widespread use there is only one paper in English and one in French which point out that it often does not alter after a highly effective dose of a bronchodilator drug.

In regard to the method of recording the test, there can be no doubt that a spirographic tracing is to be preferred to automatic devices which simply record the volume expired in a set time interval and the vital capacity. Franklin[1] and his colleagues have stressed the amount of information which may be obtained by a qualitative study of the tracings themselves; in addition, they form a permanent record which may be referred to each time a new method of assessing them numerically is described. Point is given to this observation by the recent description of two new variants of the test. Miller[2] and his associates have advocated the measurement of the volume expired at 0·5 second for the very sound reason that it is more closely related than the volumes of longer time intervals to the peak expiratory flow rate; this is reached in about a tenth of a second, after which it falls off quite rapidly. The performance of most spirometers will not allow accurate reflection of these changes. Such a test is in fact aiming to do what a pneumotachograph would certainly do better. Furthermore, for practical purposes, it offers no great advantage over the technically less exacting tests already referred to. Miller does supply an ingenious graphic method of recording the results, whereby the patient is plotted as a point on a chart. Each quadrant of the chart corresponds to a particular type of ventilatory defect: restrictive, where the vital capacity is reduced relatively more than the expiratory volume over half a second (ankylosing spondylitis, for example); obstructive, where the reverse is the case, as in asthma; combined type; and normality. The criteria for this classification have long been appreciated, and the basis of the graph is sound; the pity of it lies, not in what might be considered a mechanistic approach to the patient, but in its undoubted mechanistic approach to the clinician, who is automatically deprived of the amusement of interpreting the results logically for himself.

E. C. Leuallen and W. C. Fowler[3] have introduced a further variant in a way which could serve as a model to those who wish to introduce a new test to medical science. Preliminary pneumotachograph studies showed an initial very high peak flow in normal subjects, occurring within about 0·1 second of the beginning of expiration, a similar though smaller peak being present in patients with emphysema. In both normal and abnormal subjects, end-expiratory flow was very slow. It therefore seemed that measurement of the mean rate of flow during the expiration of the middle 50% of the vital capacity might prove a reliable and sensitive index of "expiratory retardation". Further studies showed that spirometric recordings did in fact reflect accurately the pneumotachograph pattern at this phase of expiration. A thorough study of 140 normal subjects established normal standards; at the same time, observer errors in the estimation and the repeatibility of the test were reviewed. Finally, after the test had been in routine departmental use for some time, its performance was assessed in relation to recognized tests such as the maximum breathing capacity, one and three second expiratory volumes and the vital capacity. The measurement of mid-expiratory flow was found to be the most sensitive of these tests. The authors justly conclude that it is a useful addition to ventilatory function tests, especially when the well-established tests yield borderline results. Their paper is worthy of study by all interested in this field, not only for its unequivocal demonstration of the significance and purpose of a new test, but also for its sound incidental review of the whole concept of forced expiration in relation to ventilatory disability.

[1] *New Eng. J. Med.*, 1955, 253: 799, 852.
[2] *Dis. Chest*, 1956, 30: 33.
[3] *Am. Rev. Tubero.*, 1955, 72: 783.

AGING.

THE Tenth Report of the Nuffield Foundation mentioned that the largest allocation of the year's income (1954-1955) had been set aside for payment to the National Corporation for the Care of Old People. A new grant had been made to the Department of Physiology at St. Bartholomew's Hospital Medical College, where Professor K. J. Franklin, F.R.S., proposed to investigate the physiology of the aging process from conception to death. Other grants had been made to Dr. A. Comfort, working with Professor P. B. Medawar, F.R.S., of the Department of Zoology, University College, London. An immediate result of these grants has been the compilation of a book by Comfort[1] and a summary by him[2] dealing with the literature of senescence and the prospects of research in this field. These warrant our consideration.

Two of the classical problems of science in the Middle Ages were the transmutation of metals and the prolongation of life. The first has been achieved, but comparatively little progress has been made in the second. Comfort considers definitions of senescence and finds that the most satisfactory is that senescence may be said to be occurring in a group if the rate of mortality is increasing with age; in other words, senescence is associated with an increased liability of dying. But this definition will need to be supplemented, so that criteria of senescence will be available for individuals. He lists a number of criteria, such as frequency of absence from work, the rate of healing of wounds, the elasticity of the skin, organ weights, histological changes, loss of cells, biochemical changes including increased hydration with age, and diminishing growth rate. The value of many of these criteria is weakened by the absence of general studies on them in man or animals throughout the whole life span. Another criterion is reproductive decline, which is common throughout the vertebrates but is not completely general, as oogenesis is maintained in *Daphnia* until death. Castration may have no effect on longevity or may even increase life expectancy, which shows that a simple teleological explanation of aging as a process to dispose of non-reproductive and hence biologically redundant individuals may be misleading. Nevertheless, it is possible that evolutionary pressures may have acted in the past so as to delay the effects of deleterious genes until old age.

Comfort believes that many more comparative studies should be carried out, since it is easy to show that generalisations true with one animal group may not be generally true. He has amassed a most useful bibliography and cites S. S. Flower as having cleared away much legendary material. When we consider the life span—that is, the maximum age attainable by a species—man seems

[1] "The Biology of Senescence", Routledge and Kegan Paul, London, 1956.
[2] "The Biology of Old Age", *Nature*, 1956, 178: 391.

to be well placed. Well authenticated records of great ages, one hundred and five to one hundred and ten years, are available, and this life span seems greater than the life span of other mammals. Thus elephants, who are notably long-lived, do not appear to live much longer than seventy years. Whales, on the other hand, are sexually mature at five years and have a life span of perhaps twenty years. Some birds, such as parrots, appear to have a life span of more than seventy years.

Comfort deplores the absence of sufficient life table studies, which are adequate only in the case of man, plaice, *Microtus*, *Mastomys* and laboratory rats and mice among mammals. No life table exists for any reptile, fish or amphibian. Comfort concludes that "senescence is a change in the behaviour with age, which leads to a decreased power of survival and adjustment. It is not a single overall process; except in the evolutionary sense we have outlined". Among the factors responsible are the deterioration of irreplaceable structures, the sum of previous injuries imperfectly repaired, and progressive changes in cell response and organ function. Comfort comments that the "objective of prolonging human life is one which can bear aggressive restatement from gerontologists".

THE DEATH OF SIR LIONEL WHITBY.

THE announcement of Sir Lionel Whitby's sudden death soon after his return to England from his visit to Australia and New Zealand as Sims Commonwealth Travelling Professor has been received with deep regret. When it was learned that he was to visit Australia, those who already knew him looked forward eagerly to the renewal of an acquaintance of which they had happy memories, and those who had not met him knew his reputation as scientific worker, author and teacher, and hoped for advancement of their own knowledge from what he would tell them. No one was disappointed, and all who met and talked with him did not fail to profit from his ripe experience and broad outlook on medicine and on life itself. The medical profession of the world is under a debt to him—he was preeminent in British medicine and responded to a wider call when it was made. He was sought by Australian post-graduate students when he was Regius Professor of Physic at Cambridge, and they were invariably drawn to him by his sympathetic understanding and the warmth of his personality. We cannot forget the success that attended his presidency of the First World Conference on Medical Education. After this he was drawn into the inner circles of the World Medical Association and became a member of its Council, where his influence was always felt. The medical profession of Australia will long remember his recent visit to these shores, and offers its sympathy to Lady Whitby, his radiant and distinguished helpmate, in her sudden loss.

ARBUTHNOT LANE.

IT may well be imagined that any young graduate of Guy's Hospital, London, once looked upon it as an exceptional privilege to be given the opportunity of becoming house surgeon to Arbuthnot Lane. One of these fortunate young doctors, T. B. Layton, seems to have been greatly influenced by the wise precepts, superb craftsmanship and exemplary character of his late chief; and in this case it was an admiration which lasted from the time he was a student and house surgeon to the end of his career as a surgical specialist of high reputation in London.

For some years Layton has been engaged in collecting personal reminiscences from Lane's relatives, colleagues and friends with a view to writing an appreciation of his revered master, and this is now presented in its complete form as "an enquiry into the mind and influence of a surgeon".[1] We are all in favour of this book having been written, although it is not the first biography of Sir Arbuthnot Lane to be published; and, moreover, it tells substantially the same story as that vividly related ten years ago by the late W. E. Tanner (to whose basic study Layton surprisingly makes no reference). However, in our review of Tanner's excellent biography[2] it was hinted that further reminiscences from Lane's contemporaries might be most helpful to some future medical historian, particularly as this much criticized surgeon-philosopher evidently possessed many of the qualities of true greatness in his general make-up. Mr. Layton has certainly been successful in obtaining a number of "personal recollections" from distinguished people, both at home and abroad; but overseas visitors who still remember Lane as a delightful personality, full of quiet dignity in his speech and manner, will perhaps sense some incongruity in the constant repetition of the hospital nickname "Willie"; and travellers to the New World may feel the same way at mention of the elder Mayo brother as "Dr. Willy" instead of the familiar "Dr. Will". Moreover, our more sensitive and parochially minded will not be happy to find the four great dominions of the Commonwealth still being designated as "colonies" in such a recent publication. For all that, Layton has made a worthwhile "enquiry", and all aspiring surgeons would do well to study the life, work and character of Sir Arbuthnot Lane as so far revealed in these two interesting biographies.

INTRODUCTION OF THE RAD IN RADIOTHERAPY PRACTICE.

THE röntgen (*r*) was formally adopted in 1928, at the second International Congress of Radiology, as a unit of radiation dosage. It is a measure of the ionization produced in one cubic centimetre of air by the passage of an X-ray beam. The name commemorates Wilhelm Konrad Röntgen (1845-1923), the German physicist who discovered X rays. For many years it has been realized that a further unit is necessary to express the amount of radiation absorbed by tissue (the absorbed dose). This is necessary because different qualities of radiation are differentially absorbed by various tissues. With the advent of the use of high energy radiation (one to ten million electron volts) in clinical practice, the differing absorption of tissue has become more important, and the only quantitative way of comparing dosages in radiation generated at many varying potentials is to adopt a unit of absorbed dose. The unit will also be valid for other ionizing corpuscles such as electrons, protons and neutrons. In 1950 the International Commission on Radiological Units formally introduced such a unit of absorbed dose, and in 1953 this unit was given the name "rad". One rad is the energy absorption of 100 ergs by one gramme of tissue, whether it be skin, muscle or bone. In the 250 kilovolt range, the passage of 100*r* through one gramme of muscle results in the absorption of 93 ergs—or, as it now can be expressed, 93 rads. However, the absorption in other tissues, particularly bone, is different, and the rad will express accurately the energy absorbed by that tissue. Biological effects are dependent on energy absorbed; so the rad is the logical unit to use for the purpose of correlating biological effect with dose. The readjustments in thinking and methods involved in the introduction of the rad to radiotherapy practice were discussed in a symposium[3] at the annual congress of the British Institute of Radiology in December, 1955, to which those interested are referred. Many tables are given for the purpose of converting röntgen dosage at various qualities to this new unit.

[1] "Sir William Arbuthnot Lane, Bt., C.B., M.S.: An Enquiry into the Mind and Influence of a Surgeon", by T. B. Layton, D.S.O., M.S. 1956. Edinburgh and London: E. and S. Livingstone, Limited. 9" x 6¼", pp. 136, with nine illustrations. Price: 21.

[2] M. J. AUSTRALIA, January 18, 1947.

[3] *Brit. J. Radiol.*, July, 1956.

Abstracts from Medical Literature.

MEDICINE.

Generalized Ischæmia of the Heart.

W. F. M. FULTON (*Brit. Heart J.*, July, 1956) has injected the coronary arteries with radioopaque material in hearts which were the subject of advanced ischæmic disease. It was found that in these hearts the coronary arterial tree had ceased to be a tree and had become a network, owing to extensive anastomotic development, occurring especially in the subendocardial arterial plexus of the left ventricle. In such hearts, which had long survived advanced coronary atherosclerosis with narrowing of the ostia of both coronary arteries, terminal myocardial damage was not in the form of regional infarction, and was indeed in no case precipitated by recent coronary occlusion, despite evidence that thrombotic occlusion had been of frequent occurrence; but it was in the form of focal necrosis, mostly dotted through the subendocardial layer of the heart muscle. The author postulates that the conversion of the coronary circulation into a network of dilated channels had removed the anatomical basis upon which infarction could have occurred.

Hyperventilation and the Electrocardiogram.

R. H. WASSERBURGER AND T. H. LORENZ (*Am. Heart J.*, May, 1956) have found that abnormalities in the electrocardiogram due to hyperventilation are promptly abolished by the administration of propantheline bromide. The abnormalities consist of coving, with either elevation or depression of the proximal segment, of *RS-T* and inversion of *T* in more than one of the precordial leads from V1 to V6.

Myasthenia Gravis.

H. SCHWARZ (*Canad. M.A.J.*, July 15, 1956) records the results of treatment of *myasthenia gravis* with "Mestinon" (pyridostigmine bromide). He states that "Mestinon" is less toxic than prostigmine, and is effective though the dose used has to be much larger, 60 milligrammes of "Mestinon" replacing 15 milligrammes of prostigmine. Three to 10 tablets of "Mestinon" daily control the myasthenic symptoms. "Mestinon" was used in this study either alone or in combination with prostigmine. It did not as a rule cause gastro-intestinal stimulation, and was for that reason preferable to prostigmine.

Lupus Erythematosus.

J. F. MULLINS *et alii* (*J.A.M.A.*, June 30, 1956) discuss the use of "Plaquenil" in the treatment of *lupus erythematosus*. They state that quinacrine ("Atabrin") hydrochloride and chloroquine ("Aralon") phosphate have been effective in the management of localized œdematous, chronic discoid and some benign types of *lupus erythematosus*, but not of advanced subacute, acute disseminated or protracted systemic *lupus erythematosus*. In the last-mentioned disorders ACTH, cortisone, hydrocortisone and prednisone have been helpful. Quinacrine caused dermatitis in some cases, as well as yellow skin and gastric upsets. Chloroquine sometimes produced nausea, giddiness, poor focusing and, rarely, dermatoses. "Plaquenil", which is related to chloroquine, has been used in the management of 40 cases of benign *lupus erythematosus* on the arms and face. A dosage of 800 milligrammes per day gave satisfactory results as a rule. The drug prevented the transformation of evanescent lupus into the chronic discoid or subacute types.

Peripheral Arterial Disease.

J. M. STALLWORTH AND J. V. JEFFORDS (*J.A.M.A.*, June 30, 1956) discuss the effects of azapetine ("Ilidar") on peripheral arterial disease. Fifty-two patients were studied. Seventy-five to 100 milligrammes of azapetine were given orally to 49 patients each day. The majority of patients responded satisfactorily, with increased warmth and relief of pain due to the arterial disease. Intravenous azapetine therapy (one milligramme per kilogram of body weight in 250 millilitres of saline injected intravenously over a thirty-minute period) was given in a few cases. Generally the response to treatment was good in some 70% of cases. Hypotensive crises occurred in some cases; consequently the smallest effective doses are to be used. Sympathectomy gave somewhat similar results in seven cases. It is to be noted that the results of sympathectomy are often minor and transient, and the results of treatment recorded in this paper do not indicate any prolonged or permanent effect.

Mönckeberg's Arteriosclerosis.

S. SILBERT, H. I. LIPPMANN AND E. GORDON (*Arch. Int. Med.*, March, 1956) discuss Mönckeberg's arteriosclerosis and state that it is a clinically benign form of calcification of the blood vessels, and is differentiated from intimal arteriosclerosis. The latter often proceeds to progressive occlusion of the blood vessels and carries an unfavourable prognosis. In Mönckeberg's arteriosclerosis, thrombosis of the blood vessels in the extremities does not occur, and in patients who have been observed for many years there has been no tendency to develop impaired circulation. Mönckeberg's arteriosclerosis is distinguished from other forms by extreme calcification of the arteries of the lower extremities in young and middle-aged persons who have no symptoms or signs of impaired circulation. Calcification of the blood vessels is usually discovered by accident when an X-ray examination is made for arthritis, fracture or some other bone or joint condition. There are no complaints of coldness or pain in the legs or difficulty in walking. All pulsations are easily felt in both feet and are normal in size. Oscillometric and temperature studies indicate a normal blood flow. The prognosis in Mönckeberg's arteriosclerosis is good, and there is no tendency to develop intermittent claudication, ulceration or gangrene. No treatment is necessary. Nocturnal leg cramps occur in one-third of the cases, and can be promptly relieved by calcium lactate given orally. Pathologically, the disease is characterized by a deposit of calcium in the media of the arteries, believed to be due to calcific dystrophy of the media ground substance. There is no thickening of the intimal layer, which is the most striking feature of intimal arteriosclerosis, and the blood vessel lumen is therefore not narrowed. The surface of the intima remains uninjured, and thrombosis does not occur. Radiographically, in typical cases dense uniform calcification outlines the major arteries and their branches. The calcium appears to be deposited in transverse lines, so that the appearance is that of a chain of rings similar to a goose neck. In contrast, calcification in intimal arteriosclerosis is patchy and dispersed, and tends to be deposited in the long axis of the blood vessels.

Systemic Lupus Erythematosus.

E. L. DUBOIS (*Ann. Int. Med.*, August, 1956) discusses systemic *lupus erythematosus* and recent advances in its diagnosis and treatment. A review is presented of 163 cases of this disease over a period of six years. The apparently increasing incidence of *lupus erythematosus* is a function of the more frequent usage of the L.E. cell test, and of the concept of a much broader spectrum of systemic *lupus erythematosus*, which is a chronic disease resembling rheumatoid arthritis. Part of the rising incidence is also due to the perfection of more sensitive techniques of L.E. cell detection. Simultaneous L.E. cell studies were performed on 44 patients with systemic *lupus erythematosus* by four different methods, and it is advised that at least three different types of L.E. cell tests should be performed to screen a suspected case adequately. L.E. cells are not found in all patients with the disease. Of this series, 38·6% had spontaneous remissions prior to any special therapy, and many of the treated patients would have had remissions without treatment. Of the series 6% had at least two remissions, and 16% had three or more. This makes evaluation of therapy difficult. Anti-malarial drugs have a definite place in the treatment of systemic *lupus erythematosus*, particularly in the milder cases. Their effect on the cutaneous lesions is almost specific, and the arthritis is also greatly relieved. Their synergistic use with steroids often reduces the steroid dose and may permit one to stop steroid treatment entirely. Of the more mildly affected patients, 80% are benefited by anti-malarial drugs alone. Steroid therapy is still the mainstay of treatment of acutely ill patients, and benefits 90%. Nitrogen mustard has been shown to ameliorate the nephropathy of systemic *lupus erythematosus*, particularly in the more œdematous patients. Their lives are prolonged by this form of therapy. The median duration of life of 59 untreated or inadequately treated patients was twenty-four months. In the present series of 138 adequately treated patients, ill for twenty-four months or more, less than 10% have died. This difference is significant.

Anticoagulant Treatment in Acute Coronary Occlusion.

C. HOLTEN (*Acta med. scandinav.*, Volume CLV, Fasc. 1, 1956) discusses anticoagulant treatment in acute coronary occlusion with special reference to indica-

tions. The mode of action of anticoagulants is considered, and it is postulated that, apart from the inhibiting effect on complicating thrombo-embolism, there is an effect on the pathological process in the heart itself, presumably the occluding process in the coronary arteries. The author prefers to administer heparin initially in a sterile solution containing a colloid material, in doses of 10,000 to 20,000 international units, at intervals of eight hours. This method is used for six doses, with follow-on treatment with a dicoumarol product. The treatment should begin as early as possible after diagnosis. Russek's classification of good and bad risk cases is challenged by the author, in so far as it may be two or three days after the onset of the lesion before signs of a bad risk case will develop. In a series of 200 consecutive patients with acute coronary occlusion, arrhythmia was found on admission to hospital or within twenty-four hours in 36, and in 51 arrhythmia developed at a later stage. Signs of congestive cardiac failure without arrhythmia appeared at a later stage in 10 patients. In 22% of this series Russek's criteria would have been misleading. Control with daily prothrombin determinations is absolutely necessary. In a series of 166 patients with acute coronary occlusion treated with heparin and dicoumarol, five episodes of slight hæmorrhage occurred (3%). In four cases thrombo-embolic complications occurred, but none of these appeared at a time when the patient could have been under the full effect of the anticoagulant.

Hepatic Changes in Jaundice Due to Chlorpromazine.

A. A. STEIN AND A. W. WRIGHT (*J.A.M.A.*, June 9, 1956) discuss hepatic pathological changes in jaundice due to chlorpromazine, and present the clinical notes and findings in four cases. Two patients who had received chlorpromazine died while jaundiced, and autopsy was performed. A third patient, who had received chlorpromazine and had been icteric for about one month, underwent an exploratory laparotomy while the jaundice was at its height, and a general biopsy of the liver was carried out. A fourth patient, who had had chlorpromazine jaundice for five weeks, died approximately one week after clinical icterus had disappeared, and also came to autopsy. The hepatic changes found in each of these cases, together with a brief clinical history, are presented. Examination of the hepatic tissues revealed intrahepatic bile canaliculus obstruction that was indistinguishable from other types of obstructive jaundice, except those in which the larger bile ducts were much involved, usually as a result of extrahepatic duct obstruction. After the recession of the jaundice, the liver tissues apparently returned to normal without residual evidence of previous injury. The severely icteric patient from whose liver a biopsy specimen was taken responded well to cortisone therapy. The three other patients died—one while intensely jaundiced, one while the jaundice was receding, and the third after the jaundice had disappeared. Autopsy was performed in these cases. Though the mechanism by which jaundice is produced in these cases is not yet fully clear, it is suggested that chlorpromazine may directly affect the liver in such a way as to alter the composition of the bile, leading to its inspissation or increased viscosity. The resulting increase in viscosity could lead to intrahepatic bile stasis, especially in the smaller canaliculi.

The Menopause.

J. ROGERS (*New England J. Med.*, April 19, 1956) discusses the menopause and its treatment with œstrogens, androgens and vitamin *E*. The menopause is a normal phase in which there is a gradual decline of ovarian activity, followed by a low but significant level of post-menopausal ovarian function. It is commonly attended by hormonally mediated symptoms, such as hot flushes; but the more publicized symptoms appear to be related to concomitant changes in the life situation. The physician's responsibility to the woman in this phase is clear and consists chiefly in education, reassurance and guidance. Less clearly defined is the management of the post-menopausal state which, in view of the rapidly lengthening life span, is becoming an increasingly important problem. There is, as yet, no proof that œstrogens will prevent or delay the aging process, and other steroids are probably implicated as well. Rather impressive evidence can be cited, however, for a beneficial action of œstrogen on dermal and genital atrophy, osteoporosis and atherosclerosis. The fear that œstrogens as used therapeutically are carcinogenic in human beings is not justified by current evidence. The question of long-term steroidal therapy of the post-menopausal woman remains unanswered.

The Treatment of Liver Disease.

I. F. TULLIS (*Ann. Int. Med.*, January, 1956) discusses what is important in the treatment of liver disease. The most important features are rest and the successful administration of a diet of high protein and Calorie content. In acute infectious hepatitis, bed-rest with bathroom privileges should be observed at least until there is evidence of diminishing bilirubinæmia, and preferably until the one-minute serum bilirubin content is 1·0 milligramme per 100 millilitres or less. In chronic liver disease, similar bed-rest should probably be continued for as long as the patient is showing evidence of improvement. While adequate Calorie intake alone will provide improvement in liver disease, the most striking improvement in the chronic form results from a high protein intake over a period of many months to combat the serious nitrogen depletion. Alcohol should be omitted entirely. Vitamins, lipotropic agents, testosterone and adrenal hormones offer no additional advantage in average cases of liver disease. The complication of ascites can be managed best by strict sodium restriction in addition to the basic treatment programme. The clinician should be alert to the earliest signs of impending hepatic coma—mental disturbance and characteristic tremor. Protein should be administered with caution in such instances, and corticotropin and cortisone may be beneficial. Massive hæmorrhage from varices of the upper part of the gastro-intestinal tract deserves definitive surgical therapy in most instances, to ward off subsequent fatal hæmorrhage.

Splenectomy in Refractory Subacute Bacterial Endocarditis.

C. J. LINGEMAN, E. B. SMITH, J. S. BATTERSBY AND R. H. BEHNKE (*Arch. Int. Med.*, March, 1956) present the clinical histories of three patients suffering from subacute bacterial endocarditis who were submitted to splenectomy. They state that splenomegaly is present in the majority of patients with this disease, and the common pathological changes in the spleen are congestion, hyperplasia and infarction. Pain in the left upper quadrant of the abdomen occurs infrequently, and spontaneous rupture is rare. Probably more often than is suspected a splenic infarct becomes infected, and the necrotic material is an excellent culture medium for bacteria. Antibiotics, even in high blood levels, apparently cannot penetrate the "barrier" to eradicate the "focus". Each of the three patients in this series presented typical features of subacute bacterial endocarditis with continuous bacteriæmia in the presence of high blood levels of antibiotics. After splenectomy each patient became afebrile, and repeated attempts at blood culture gave negative results. The spleens of all three patients contained "infected" infarcts, and streptococci were grown on culture from two. Two of the patients are living eight and two and a half years respectively after splenectomy, and are free of infection. The third patient showed clinical improvement for five years, but later succumbed to congestive heart failure with evidence of severe rheumatic valvular disease. The authors state that splenectomy is a valuable therapeutic procedure in selected cases of subacute bacterial endocarditis, in which adequate and appropriate antibiotic therapy fails. In these cases an infected infarct of the spleen is apparently the source of the persistent bacteriæmia.

Scalene Node Biopsy.

N. J. ENGLAND (*Canad. M.A.J.*, August 15, 1956) discusses the use of biopsy of the scalene lymph node in the diagnosis of intrathoracic disease. He points out that the rationale of the procedure is in the existence of connexions between the mediastinal and scalene groups of lymphatic glands. He stresses the value of scalene node biopsy, particularly where radiographic examination reveals diffuse pulmonary infiltration, or mediastinal lymphadenopathy. He states that the scalene glands appear to be frequently involved in sarcoidosis and that biopsy may reveal the correct diagnosis in many cases of this disease when other peripheral glands are not apparently affected. It has been suggested that in bronchogenic carcinoma the failure to find malignant cells in a scalene node may be regarded as an indication for operation. The author does not agree with this and mentions that of five cases in which the scalene node was found to be free of tumour cells widespread metastases were present in two, and mediastinal involvement in three. He concludes that in certain cases of intrathoracic disease scalene node biopsy will quickly establish the diagnosis and save much needless investigation.

College of Pathologists of Australia.

INAUGURAL MEETING.

THE inaugural meeting of the College of Pathologists of Australia was held at the Royal Australasian College of Surgeons, Spring Street, Melbourne, on August 30, 1956. The meeting was attended by over 70 foundation members of the college, as well as by representatives of the Commonwealth and State Governments, the armed forces, other medical colleges and societies, the University of Melbourne and civic dignitaries.

Dr. E. F. Thomson, the President of the college, after welcoming the Commonwealth Minister for Health, the Honourable D. A. Cameron, to the meeting, said that the meeting was a milestone in the history of pathology in Australia. He briefly outlined the history of the college and its establishment. He said that in 1948, at a meeting of pathologists in Brisbane, it had been decided to establish an Australian Association of Clinical Pathologists, with Dr. A. H. Tebbutt, of Sydney, as provisional secretary and himself as president. Later in 1948 the inaugural meeting of that association was held in Melbourne, and it had met regularly since, in various Australian capital cities. In 1954 the name of the association was changed to the Australian Association of Pathologists, and subsequently it was decided to form the College of Pathologists of Australia. Dr. Thomson expressed the hope that the college would unite in a body to function at a Commonwealth level and act for the pathologists of Australia, taking into account both teaching and research and the practice of pathology.

The Honourable D. A. Cameron, Federal Minister for Health, expressed his pleasure at being asked to perform the opening ceremony of the College and at being able to associate the Commonwealth Government with that opening, which was an important step in the growth of Australian medicine. He said that he thought that it was agreed nowadays that future advances would develop from the results and work of those in the laboratory, rather than from the observations of clinical practice, because of the efficiency of what went on in the laboratory. Both general and specialist practice depended for future standards on what went on in the laboratory and what came out of it. The efficiency of teaching also increased with the spread of knowledge of pathology. Of recent times in some countries, the encouragement of the scientist and the provision of facilities for his training had been great. In other countries lack of encouragement had been a feature, and it was only now that Australia and Britain were realizing that steps must be taken in the right direction. The question of government assistance in the production of scientists and medical graduates was a matter of priorities, and that state of affairs meant an increase in responsibilities, activities and influence of the new college. Dr. Cameron referred briefly to various problems of importance from the point of view of pathology, including tumour growth, old age and heart disease, the remaining problems of infectious diseases, and radiation. He also referred to the help that Australia could give neighbouring nations in the field of medicine, if the science of medicine in Australia maintained and continued to increase its own standard. That was the responsibility which rested on the new college. Dr. Cameron then declared the college open.

Dr. J. I. Tonge, a member of the council of the college, then presented the following persons for admission to honorary membership of the college: Sir Macfarlane Burnet, Dr. J. V. Duhig, Professor E. S. J. King, Dr. Oliver Latham, Sir Peter MacCallum and Dr. Reginald Webster. The following persons were admitted *in absentia* to honorary membership: Dr. J. B. Cleland, Dr. A. N. Kingsbury, Dr. E. M. Little, Dr. R. A. O'Brien, Dr. A. H. Tebbutt and Dr. H. K. Ward.

Dr. J. W. Perry, the Vice-President of the college, then delivered an address on the role of pathology in modern medicine. He briefly traced the history of pathology from the earliest times up to the nineteenth century, when in 1819 the first chair of pathological anatomy was established in the French University at Strasbourg. He referred then to a series of men who had subsequently become famous in the field of pathology and gave more detailed attention to those who had made important contributions to the subject in Australia. He also described the development of university and hospital departments of pathology and research institutes in Australia. He said that the future augured well, and though there was no room for complacency or marking time, the College of Pathologists of Australia came into existence deeply conscious of the efforts of those who had laid the solid foundation of laboratory medicine in Australia. If the college could by its efforts help to promote an environment for young men such as had been created by their predecessors, they were justified in approaching the future with confidence.

The President then thanked Dr. Perry for his address and closed the meeting.

Office Bearers.

The first office bearers of the College of Pathologists of Australia are as follows: *President*, Dr. E. F. Thomson (New South Wales); *Vice-President*, Dr. J. W. Perry (Victoria); *Honorary Secretary*, Dr. J. L. Holme (New South Wales); *Honorary Treasurer*, Dr. J. R. S. Douglas (New South Wales); *Councillors*, Dr. J. I. Tonge (Queensland), Dr. J. P. E. O'Brien (New South Wales), Dr. H. N. Bettinger (Victoria), Dr. J. E. McCartney (South Australia), Dr. B. J. Lawrence (Western Australia), Dr. C. A. Duncan (Tasmania).

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pædiatric Society of Victoria was held at Prince Henry's Hospital on September 12, 1956.

Tuberculous Meningitis.

DR. D. HAGGER and DR. E. DODGE presented the clinical details of a case of tuberculous meningitis. Dr. Hagger first outlined the rather tragic story of the family from which the patient came. He said that it was a story about which there was nothing very new, but it was one which emphasized some important truths about the natural history of tuberculosis; although it was a waning disease, its power must not be under-estimated.

On September 28, 1955, the mother had gone to hospital for the birth of her eighth child. A man and his wife came from the country to stay in the house during her absence. The wife supervised the household. The man had a productive cough.

On December 2, 1955, one child, A., aged nine years, presented with *erythema nodosum*. Her Mantoux reaction was positive, and her right hilar glands were a little enlarged. No tubercle bacilli grew in culture from gastric washings, and she was given no antituberculosis drugs. She remained in hospital six weeks, during which her weight increased from four stone six pounds to four stone eleven pounds.

On January 21, 1956, B., aged twenty months, was admitted to hospital with miliary tuberculosis, from which she died on February 2, three weeks after her first symptoms were noticed.

On February 7, 1956, C., aged eight years, was admitted to hospital with right pleural effusion.

On February 9, 1956, the remaining members of the family at last kept an appointment for Mantoux testing. All the results were positive, except that for the new baby, which was negative, and that for the mother, which was doubtful.

A few days later radiographs were obtained of the parents and of the four children who had positive Mantoux reactions and were still at home. The mother was normal, and she and the baby were given B.C.G. D., E. and F. showed some enlargement of hilar lymph nodes. The father had an area of mottling behind the second and third left intercostal spaces. He would not believe it, and only with great difficulty was he eventually persuaded to accept treatment from the Repatriation Department. He would not enter hospital, but agreed to be treated at home, and there he received streptomycin and isonicotinic acid hydrazide.

Meanwhile on May 26, 1956, A. was admitted to hospital with right pleural effusion and on June 3 D. with the same condition. On June 7 E. was admitted with meningitis. On the same day the remaining three children, though clinically well, were started on a six months' course of isonicotinic acid hydrazide; and the health authorities having agreed to exercise their powers of compulsory hospital admission, the father, confronted with imminent police action, went to hospital.

In the three months which had since elapsed there had been no fresh developments.

Dr. Hagger said that he had four comments he would like to make about the story. Firstly, it seemed likely that the

country visitor introduced the infection. Dr. Hagger drew attention to the eight or nine weeks' interval before the *erythema nodosum* and the sixteen weeks' interval until the case of miliary tuberculosis. Secondly, he thought that the family corroborated the warning about the greater seriousness of tuberculous infection when contracted in the home. Thirdly, he raised the question of why the last three cases all brought the children to hospital in the short space of twelve days. They had all been known to have positive Mantoux reactions and enlarged hilar glands for over three months, and A. for almost six months. Dr. Hagger thought that this latest outbreak might be related to the full-time presence in the home of the father with an open tuberculous lesion. Until sixteen days previously, he had continued at work. Sending him home to bed had, possibly, had this disastrous effect.

Lastly, Dr. Hagger asked what was really considered the correct management of children with positive Mantoux reactions, enlarged hilar glands and little or nothing else abnormal. It was perhaps usual to give those under twelve or eighteen months of age isonicotinic acid hydrazide, and for those who were older, to prescribe freedom except for regular supervision and adequate rest and nutrition. Experience of the present family made him question that policy. He felt that in future, when the infection had probably been acquired in the home and therefore been a heavy one, even though the source of infection had been removed, he would treat all the children involved more actively with isonicotinic acid hydrazide and, if progress was not good, bed rest in hospital.

Dr. Dodge then discussed the clinical details of E., aged three years, who presented with a ten-day history of malaise. He said that during the four days prior to admission to hospital she had been given penicillin for an inflamed ear, but over a period of twenty-four hours she developed the signs and symptoms of meningitis. On examination of the child a tubercle was seen in the right fundus. Lumbar puncture had yielded a clear fluid, which, by examination of a smear, was shown to contain occasional bacteria resembling pneumococci. A culture had yielded α-hæmolytic streptococci which could not be typed. The fluid contained 140 lymphocytes and 450 polymorphonuclear leucocytes per cubic millimetre, and 100 milligrammes of protein and 40 milligrammes of sugar per 100 millilitres. The child was treated with penicillin for forty-eight hours without much clinical improvement and then one tubercle bacillus was detected in the cerebro-spinal fluid. Penicillin therapy was discontinued, and streptomycin and isonicotinic acid hydrazide were given. On the fourth day the child was still very ill, and the cerebro-spinal fluid became opalescent, the polymorphonuclear cell count being 1050 per cubic millimetre. Thus it was thought that the child had a mixed meningitis, and penicillin therapy was recommenced. Clinical improvement occurred only after the commencement of cortisone therapy on the fourteenth day, at which time fibrin clots were noted in the cerebro-spinal fluid during lumbar puncture.

Estimations were made of the amount of streptomycin in the cerebro-spinal fluid; that prior to the administration of cortisone was less than 1·0 γ per millilitre, and it rose to 20 γ per millilitre after one intrathecal injection of streptomycin. The streptomycin titre remained at 10 γ per millilitre for forty days; then the dosage of cortisone was reduced rapidly, as the child, who was much improved clinically and then had normal cerebro-spinal fluid, developed an intercurrent pulmonary infection. The X-ray appearances of the lung were thought to indicate an area of collapse due to further enlargement of lymph nodes.

The streptomycin titre fell with the reduction in dosage of cortisone and was 0·5 γ per millilitre six days after cortisone therapy had ceased. The streptomycin titre of the cerebro-spinal fluid was constant, irrespective of the time of day at which the fluid was taken. The blood streptomycin titre was 8·0 γ per millilitre.

The organism grown in culture from gastric lavage material was sensitive to 0·1 γ per millilitre of isonicotinic acid hydrazide and to 10 γ per millilitre of streptomycin. The amount of isonicotinic acid hydrazide in the cerebro-spinal fluid was 3·5 γ per millilitre. Children not suffering from meningitis who received streptomycin alone, a combination of streptomycin and isonicotinic acid hydrazide, and a combination of streptomycin, isonicotinic acid hydrazide and cortisone had 0·5 γ per millilitre of streptomycin in the cerebro-spinal fluid.

Dr. Dodge concluded by saying that the case was one of probably mixed meningitis (tuberculous and streptococcal), treated with streptomycin and isonicotinic acid hydrazide, in which clinical improvement had occurred only with the administration of cortisone; at that time streptomycin appeared in the cerebro-spinal fluid in high concentration which waned when the dosage of cortisone was reduced. In children not suffering from tuberculous meningitis the amount of streptomycin in the cerebro-spinal fluid, despite the same therapy, was negligible.

DR. S. WILLIAMS, who opened the discussion, said that he thought that cortisone did help in cases of meningitis in either preventing adhesions or allowing the organism to be more susceptible. He also said that isonicotinic acid hydrazide was a unique drug, in that it appeared to penetrate into caseous tissue; one also obtained a good level in the cerebro-spinal fluid. He used this drug in the treatment of children with primary tuberculosis if they had symptoms; those symptoms included the finding of a shadow in the chest X-ray film or enlarged hilar glands.

DR. H. WILLIAMS said that it seemed extraordinary that in such a common disease there was no adequate therapeutic trial of those drugs in the management of primary tuberculosis in children. They probably would never know the answer now. He said that it was uncommon to be able to date the infection so well as in the family under discussion; but if one could do so and the onset was considered to be within a few months, then it was probably wise to give a course of therapy if there were some symptoms. If one just discovered a positive Mantoux reaction, then probably no treatment was necessary.

DR. MONA BLANCH asked whether it was safe to use isonicotinic acid hydrazide alone. If it was, then one was in a better position to treat the children concerned more generously.

Dr. Hagger, in reply, said that when isonicotinic acid hydrazide was used alone, the development of resistance was uncommon in primary infection. Other drugs could be reserved for the treatment of complications if they occurred.

Follow-Up Report on a Case of Lingual Thyroid.

DR. D. HAGGER and DR. R. LAWSON gave a follow-up report on the case of lingual thyroid, details of which they had previously presented to the society in August, 1955.

Dr. Hagger said that the patient, a girl, was now twelve and a quarter years of age, and eight months after the operation she was very well and was making normal progress both scholastically and at sport.

No thyroid treatment had been given at any stage. She had not felt the cold much during the winter just past, and there had been no change in her bowel habits. She was in early puberty, but had not yet menstruated. She had gained one stone in weight since operation and had grown one and a half inches. Her blood pressure and pulse rate had remained the same. Her basal metabolic rate before operation had been −5% and after operation −1%. Her serum cholesterol content had been 198 milligrammes per 100 millilitres before operation and 303 milligrammes per 100 millilitres after operation. Radioactive iodine uptake before operation was only in the sublingual position, and eight months after operation there was none in the sublingual position. Of the total dose 18% was in the region of the graft, which was in the range to be expected from a normally acting gland. Dr. Hagger thanked the Royal Melbourne Hospital thyroid clinic for the radioactivity determinations.

Dr. R. Lawson then gave some details of the operation. He said that the decision was made to attempt removal by the peroral route, with preparation to perform pharyngotomy or tracheotomy if required. The removal proved not to be a matter of great difficulty. The gland was shelled out of its bed in the tongue, rather after the manner of enucleation of the prostate. Grafting of the excised thyroid tissue was then attempted. The exposed surfaces of this mass were sliced off to remove those parts contaminated with saliva, including the exposed mucous epithelial lining. That left a cube of tissue with sides rather less than one inch long. That cube of thyroid gland was then sliced with a knife, in the manner of cutting a loaf of bread, into about a dozen very thin slices. Those were then implanted in small pieces into the lower half of the right *rectus abdominis* muscle, the small pieces were dropped in and the muscle was sutured over each gap with fine plain catgut, the rectus sheath being closed over all.

There was some anxiety that night because of respiratory obstruction. However, tracheotomy was avoided, and thereafter the patient made a smooth recovery. Both the tongue and the abdominal wound healed cleanly, and the patient went home ten days after operation.

Dr. Lawson said that so far as he could discover, that was the first successful thyroid graft performed in such circumstances, although partial success had been achieved in a similar case, reported by Swan in 1952 in Denver, Colorado.

DR. R. WEIGALL asked the speakers if they could tell what was the ultimate fate of transplanted thyroid tissue.

Dr. Hagger said that little was known of the fate of the grafted tissue. He said that the normal thyroid underwent certain changes with physiological reactions. He thought that after operation there would be a period of hypothyroidism, leading to increased output from the pituitary, leading in turn to hyperplasia of the graft. In the other case mentioned by Dr. Lawson, there was no evidence of activity in the graft for about four months after the operation.

DR. J. FORBES mentioned work which showed that if thiouracil was given to rats and adenomata were produced, those, when transplanted subcutaneously, could become carcinomatous.

Hæmophilus Influenzæ Laryngitis and Septicæmia.

DR. H. MCLORINAN then discussed the problem of *Hæmophilus influenzæ* laryngitis and septicæmia. He said that in 1941, Wilson had described 10 cases of acute laryngitis caused by *H. influenzæ* and associated with bacteriæmia. In 1943 du Bois and C. Anderson Aldrich had reported four similar cases. Then in 1945 Saphor had reported five cases of sudden death following œdema of the larynx in which acute myocarditis was found at autopsy. The last-mentioned experience had been corroborated in Melbourne by Dr. K. M. Bowden.

Dr. McLorinan said that about that time he had been puzzled by children with laryngeal obstruction in whom he found it almost impossible to insert an intubation tube. Digital examination in those cases revealed a greatly swollen epiglottis with œdema of the aryepiglottic folds causing the glottic opening to be reduced to a mere slit. He coined the term "supraglottic œdema" after consultation with an ear, nose and throat colleague. The name had survived in Melbourne and probably filled the bill better than the American term "epiglottitis".

Dr. McLorinan said that he had published an account of 16 cases of the condition in 1946, but was not able to confirm the bacterial ætiology then. However, it seemed likely to him that they were similar to those reported by Wilson, as two of the patients in the series after being inadequately treated developed typical *H. influenzæ* meningitis. Since then the syndrome of difficult breathing, supraglottic œdema and bacteriæmia caused by *H. influenzæ* had been firmly established.

Dr. McLorinan then presented a summary of the cases among patients admitted to Fairfield Hospital during the past five years and described what he thought to be a typical case.

He said that since 1950, 33 patients who were diagnosed clinically as suffering from supraglottic œdema had been admitted to the Fairfield Hospital. From 24 of these *H. influenzæ* type B was grown in culture, from the throat, the epiglottis or the trachea, and frequently from all three sites in the one case. Blood culture was carried out on admission to hospital of 19 of these, and in nine *H. influenzæ* type B was grown. In 16 of the 33 cases it was found necessary to perform a tracheotomy, and no patient died.

Further confirmatory evidence that *H. influenzæ* was the organism responsible for the syndrome had been collected in the laboratory by Dr. A. Ferris and Miss Semmens at Fairfield. A special effort was made to grow *H. influenzæ* type B from 40 patients with laryngo-tracheo-bronchitis. Type B *H. influenzæ* was found in one instance only, although a high proportion of patients yielded *H. influenzæ* other than type B. Dr. Ferris also performed serological antibody tests for type B organisms, and he concluded that it appeared improbable that *H. influenzæ* type B was an important cause of laryngitis other than in the supraglottic form.

In outlining the symptoms, Dr. McLorinan said that the onset was sudden and often a matter of hours, although in a few cases there might be a history of a snuffly nose for a few days. Difficult breathing was usually the first sign, although a child old enough might complain of a sore throat on swallowing. Croup was not a symptom of the condition. There was no hoarseness or aphonia. The voice was usually not altered at all, but might have a rather strangled sound. The reason for that was, of course, that the mischief was above the cords. The trouble was supraglottic and not subglottic. The absence of a barking croupy cough and hoarseness was an important differential point from spasmodic croup and laryngo-tracheitis. The breathing was not easy to describe. As a rule both inspiration and expiration were embarrassed, but expiratory obstruction was usually the greater. That was in contrast to the subglottic obstruction in laryngeal diphtheria or laryngo-tracheitis, in which inspiratory difficulty was greater.

Dr. McLorinan emphasized the snoring character of the expiratory effort. He said that it was different from the wheezing expiration which accompanied asthma. Snoring expiration was not always present, but by placing the ear close to the mouth of the child it could usually be heard. Auscultation of the chest he considered quite useless in any case of laryngeal obstruction.

In the severe cases prostration was a prominent feature. Sinclair had described the condition as "shock". Dr. McLorinan agreed with Sinclair that the appearance of shock seemed out of all proportion to the relatively short duration of the obstructive symptoms. Pallor was marked, and the pulse was rapid. The temperature was always elevated.

Inspection of the swollen red epiglottis was not easy, but might be accomplished by pressing down firmly the back of the tongue with a spatula. The most certain way of diagnosing the condition was to insert the finger into the throat, when the round hard epiglottis could easily be recognized. The normal epiglottis was a thin leaf-like structure.

Dr. McLorinan gave the following history of a typical case:

A boy, aged seven years, well nourished and previously healthy, was admitted to hospital at 6 p.m. with a history of having woken that morning with a slight sore throat. Later in the morning he became feverish, but had no cough. There was no difficulty in breathing until after lunch, when his condition worsened rapidly. He looked very ill, and his breathing had the expiratory difficulty already described. His voice had a strangled character, but was not hoarse. He was not coughing. The parents had noted the increasing pallor of the boy during the afternoon, and he was now slightly grey and cyanosed. During examination of the throat to inspect the epiglottis, the boy stopped breathing. A rush tracheotomy was performed, and to the relief of all he recommenced breathing. When the trachea was opened, only a small amount of mucopus was obtained. This finding was characteristic and contrasted with the thick mucopus found in cases of laryngo-tracheitis. As was usual also in such cases, the breathing of the boy was relieved, but the appearance of shock took about twenty-four hours to disappear. Dr. McLorinan had concluded that the bacteriæmia and perhaps some degree of myocarditis might delay the quick recovery that one would expect when the airway was relieved. The boy was treated with anti-*H. influenzæ* drugs. His temperature fell in thirty-six hours. The tube was removed on the fourth day, and he was discharged from hospital on the twelfth day of illness.

Dr. McLorinan said that the treatment in such cases depended largely on a decision regarding when tracheotomy was necessary together with any recognized antibiotic treatment against *H. influenzæ*. He favoured streptomycin, but "Chloromycetin" and sulphonamides were effective, and the best treatment was probably to use all three. Rabbit serum had been discarded as unnecessary. Penicillin was not considered necessary.

Dr. Hagger asked what was the age distribution of the patients.

Dr. McLorinan said that they ranged from nine months to twelve years. Two cases had been met with in adults, but neither had had "positive" swabs for *H. influenzæ*.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

A NEWLY ARRIVED MEDICAL PRACTITIONER.[1]

[From the *Australasian Medical Gazette*, January, 1884.]

A FLIMSY CARD has been handed to us with a request for our comments on its contents. It purports to be issued by the "Surry Hills Provident Dispensary 379 Riley Street Dr.

[1] From the original in the Mitchell Library, Sydney.

Cheesman Physician". No Committee of Management is mentioned and its founder, governing body, and medical officer seem to be combined in Dr. Cheesman Solus. The card gives a scale of fees that must be paid by all patients these being as follows "For advice and medicines at the dispensary two shillings" and for a "visit within one mile including medicines three shillings". No doubt the dispensary is a special providence to somebody but whether to Dr. Cheesman or the patients is a matter to be decided by results. We regret that any qualified practitioner should so far forget what is due to the profession here as to practise his calling on these lines and at such a rate of fees as is calculated to bring the practice of medicine into contempt. As a recent arrival in the Colony, we will tell him what he perhaps has not realised, that people here are generally of opinion that what is "very cheap" is generally "very nasty" and that this idea is especially common with regard to the practice of medicine.

Correspondence.

THE HOSPITAL REHABILITATION CENTRE.

SIR: During Dr. Howard Rusk's lectures, delivered in Sydney and Melbourne recently, he stressed the necessity for rehabilitation departments in all the city hospitals. This service commences on the first day of the patient's illness, accident or operation, and continues until he returns to gainful employment. It is the "third phase of medicine" which takes the patient from "the bed to the job". If we wish to carry this out properly, all planning should be done to minimize the patient's disability as much as possible, and to create a correct mental outlook from the very first moment; by so doing, the patient is saved much unnecessary mental and physical suffering, and there is vast economic gain on the part of the patient, and the government agencies concerned with his welfare.

Sydney was able to show Dr. Rusk two such centres, one at Royal South Sydney Hospital and one at Prince of Wales Hospital, which is now the convalescent department of Sydney Hospital. In both of these centres an effort has been made to provide a complete service for the patient, with the minimum of expense, but with the emphasis on a good team of skilled staff directing their activities. Mr. Frank Dargan, the director of therapy at Royal South Sydney Hospital, is an Australian who has spent four years in post-graduate centres overseas, including Dr. Rusk's own centre, from which he was recommended to the hospital. Miss Squire, at Prince of Wales Hospital, is also a graduate of Sydney Occupational Therapy School, with considerable post-graduate experience overseas.

Already both centres are inundated with requests for assistance, and money is the difficulty. Royal South Sydney Hospital Centre was organized by a committee of members of the honorary medical staff, with representatives of local industry, of which there are 1200 separate entities, with 67,000 employees. This centre was officially opened by the Minister for Health on September 13, 1956, and has been working steadily ever since. It was presented by the committee to the hospital board, and they will continue to work to raise funds until it is self-supporting, or until the Hospitals Commission takes the responsibility for its management.

Private and intermediate patients are taken as out-patients, and those requiring remedial surgery or medical care are able to be admitted to the intermediate beds of the hospital. This clinic complete, with the generosity of local industry in providing equipment, cost £5000 to establish as a pilot centre.

This aspect pleased Dr. Rusk very much when he visited the hospital, because his now world famous Bellevue Medical Centre began its activities in a loft. It is available to any member of the medical profession who wishes to refer patients to the centre. The patient's doctor is kept constantly in touch with the progress and change of treatment, and is invited to visit the centre to observe the methods used and his patient's progress. The patient is returned to the care of his own doctor as soon as his special training is complete.

It would be pleasing to see all hospitals with their own departments, but until such time as these units become available, Royal South Sydney Hospital is willing and able to provide an efficient service for all those patients who do not qualify for the requirements of the Commonwealth Rehabilitation Service.

The requirements for setting up these departments are enthusiasm, faith in the ability of the disabled, a compatible and skilled staff dedicated to this work, and sufficient money to provide adequate equipment to deal with the many problems presenting. Elaborate buildings, which are our dream, are not an urgent necessity. Results in human lives are the best possible advertisement, and bring their rewards.

Yours, etc.,

M. NAOMI WING.

235 Macquarie Street,
Sydney,
November 30, 1956.

MEDICAL DIRECTOR FOR BURROUGHS WELLCOME AND COMPANY (AUSTRALIA), LIMITED.

SIR: You were good enough some months ago to carry an advertisement for this company for the post of Medical Director, and you will know that a group of eminent medical men have assisted this company in the appointment. I am therefore writing to advise you that Dr. K. Severin Alstad, M.D., M.R.C.P. (Edin.), D.P.H., has been appointed to this post and will take up his duties early in January, 1957. Dr. Alstad was educated and trained in Glasgow. He worked for four years in the Medical School, University of Otago, and has since that time had extensive clinical experience in British Columbia and Malacca.

Yours, etc.,

P. A. SMITH,
Director and General Manager.

Burroughs Wellcome and Company (Australia), Limited,
Sydney,
November 20, 1956.

EMIL KRAEPELIN, HAVELOCK ELLIS AND SIGMUND FREUD.

SIR: May I congratulate you on the editorial drawing attention to one of two centenaries this year of those explorers of limbo, Sigmund Freud and Emil Kraepelin, both of whom at times hoped to know the unknowable, the secrets of the human heart?

Kraepelin's ingenious classification of mental disorder, being emotionally neutral, is, as you say, the recognized backbone of "official" psychiatry everywhere; Freud, whose ideas are emotionally repugnant to most people, is at present the best known figure in the bad lands of the metaphysics of this or any other age. But "Australians", remarked Henry L. Menchen, the great American journalist, "are descendants of the European second-table", and in spite of this cat-like touch of malicious wit about Australians in general, Menchen described Havelock Ellis, a former Australian primary school teacher, as "the most civilised man in Europe". Havelock Ellis's erotic history is curious, his acceptance by literary Americans stranger still, and his admiration of a local Sydney crank, William J. Chidley, almost unintelligible. But Ellis preceded Freud in his chosen field, and American psychiatrists are, at least in volubility, the closest and most numerous followers of Freud.

Havelock Ellis was sent by the Department of Public Instruction from the Paddington Primary School through Fort Street to Sparkes Creek, near Maitland, and in the process he gathered the material for his six-volume monument "The Psychology of Sex". Henry Havelock Ellis visited Australia in childhood with his father, the captain of a sailing ship, and he returned to enter the Colonial Education Department at the age of sixteen as a student teacher. "In Australia", he wrote, "I gained peace of soul, my life-task was revealed to me and I was able to decide on a professional vocation." His "revealed life-task", as it is found in the library of the University of Sydney, is "The Psychology of Sex", which the Lord Chamberlain effectively advertised in London at the end of the last century by making sure that the whole edition was burned by the Public Hangman. This "shocking" description of personal experiences, written in plain English in the Victorian era, was promptly printed in America, widely read and (with all its imperfections on its head) surprisingly admired, which facilitated the social and intellectual acceptance of Sigmund Freud's murkier generalizations about the effect of sex on the human mind.

For some of Ellis's writings, one finds, have been read by most English medical men. Freud's books for the most part have not. Havelock Ellis matriculated at the University of Sydney and returned to London to gain his medical degrees (at the age of thirty). We had no medical school in Australia then. But medicine was not his "professional vocation". He never practised. He wrote on sex and dreams in lucid prose with the minimum of pseudo-scientific theorizing (which was the only part of his writing that was rubbish anyway, although his theory of a male menopause has been rehashed). He edited English, French and Spanish literature as a pot-boiler, "but", he wrote, "I would never have accomplished what I have if chance in the Australian continent had not cast me out with the little school at Sparkes Creek in the Liverpool Ranges". Most young school teachers nowadays revolt at their ordeal by isolation in the bush; none, as far as I know, have reached the pinnacle of Havelock Ellis's fame or have made more profitable use of their experiences.

Yours, etc.,

607 New South Head Road,
Rose Bay,
New South Wales.
November 23, 1956.

GODFREY HARRIS.

World Medical Association.

TENTH GENERAL ASSEMBLY.

Election of Officers.

AT its tenth General Assembly held in Havana, Cuba, from October 9 to 15, 1956, The World Medical Association elected the following officers: *President* (1956-1957): Dr. Jose A. Bustamante (Cuba). *President-Elect* (1956-1957): Dr. Ahmet Rasim Onat (Turkey). *Treasurer* (1956-1959): Dr. Ernst Fromm (Germany). *Members of Council* (1956-1959): Dr. Gunnar Gundersen (United States of America), Dr. Marcel Poumailloux (France), Dr. S. C. Sen (India), Dr. Lorenzo Garcia-Tornel (Spain).

The Council of The World Medical Association elected the following officers for the coming year: *Chairman of Council*: Dr. Lorenzo Garcia-Tornel (Spain). *Vice-Chairman of Council*: Dr. L. R. Mallen (Australia).

The officers of committees for 1956-1957 include the following: *Editorial Board*: Dr. Austin Smith (United States of America), Chairman. *International Liaison*: Dr. Jean Maystre (Switzerland), Chairman. *Medical Education*: Sir Lionel Whitby (United Kingdom), Chairman. *Medical Ethics*: Dr. P. Glorieux (Belgium), Chairman. *Miscellaneous Business*: Dr. Otto Rasmussen (Denmark), Chairman. *Planning and Finance*: Dr. T. C. Routley (Canada), Chairman. *Social Security*: Dr. Dag Knutson (Sweden), Chairman; Dr. Rolf Schloegell (Germany), Secretary.

The Council made the following appointments: *Regional Secretaries*: Asia, Dr. S. C. Sen (India); Australasia, Dr. John Hunter (Australia); Europe, Dr. Paul Cibrie (France); Latin America, Dr. Hector Rodriguez (Chile). *World Medical Journal Officials*: Dr. Austin Smith (United States of America), Executive Editor; Dr. Stanley S. B. Glider (Canada), Associate Editor; Dr. Louis H. Bauer (United States of America), Business Manager. *Liaison Officers*: Dr. Jean Maystre (Switzerland), Dr. P. Glorieux (Belgium), Dr. V. A. Fenger (Denmark).

New Member Association.

The New Zealand Branch of the British Medical Association was elected to membership in The World Medical Association at the tenth General Assembly. This association was organized in 1896 and has approximately 810 members.

Resolutions Adopted.

The following are among numerous resolutions adopted by the tenth General Assembly.

International Medical Law.

It is the primary function of the medical doctors of the world to formulate any code of International Medical Law and The World Medical Association is the only organization that can speak for the doctors of the world.

Traffic Accidents.

Whereas: The death and maiming of humanity throughout the world is increasing rapidly each year; and

Whereas: It is the duty and responsibility of the medical profession in every country of the world to assist in the preservation and maintenance of human life;

Therefore, be it resolved: That The World Medical Association recommend to its member associations that they cooperate with other agencies and authorities within their country to whatever degree is possible and necessary in a concentrated endeavor to save and preserve human life.

Obituary.

THOMAS DIXON HUGHES.

DR. ALAN GRANT has sent the following appreciation of the late Dr. Thomas Dixon Hughes.

A faithful and diligent servant of the public and of The Women's Hospital, Crown Street, Sydney, has passed from among us into "the undiscover'd country, from whose bourne no traveller returns" at the early age of fifty-eight years. Thomas Dixon Hughes was a Fellow of the Royal Australasian College of Surgeons, and a Fellow of the Royal College of Gynæcologists and Obstetricians, an examiner and tutor in obstetrics in the University of Sydney, a member of the Maternal Mortality Committee of New South Wales, and a surgeon on the staff of The Women's Hospital, Crown Street, for thirty years. His early education was at the Sydney Grammar School. He enlisted in the Australian Imperial Force in the first World War whilst he was in the first year of medicine at the University of Sydney.

Dixon Hughes's career commenced in general practice at Waverley, and soon after he was appointed to The Women's Hospital. It was here that his life's work was shaped. His initials were "T.D.H.", and his house surgeons used to say that they stood for "Toxæmia, Disproportion and Hæmorrhage". This triad was his perpetual interest. It was for his work on toxæmia and eclampsia that he became particularly well known, his attention having been focused on it by certain experiences he had with his own family, and it was appropriate that the last paper that he published a few months ago in THE MEDICAL JOURNAL OF AUSTRALIA should have summarized the results of a life's interest in this field. His interest in disproportion was set forth some years ago in a paper on the occipito-posterior position in relation to the shape of the pelvis, a paper which was far ahead of its time and still remains a model of conciseness, common sense and obstetric perspicacity. He was one of those who keenly supported and instituted the Mobile Blood Transfusion Service, and he was insistent that The Women's Hospital should be the first to start it, in conjunction with the Board of Health.

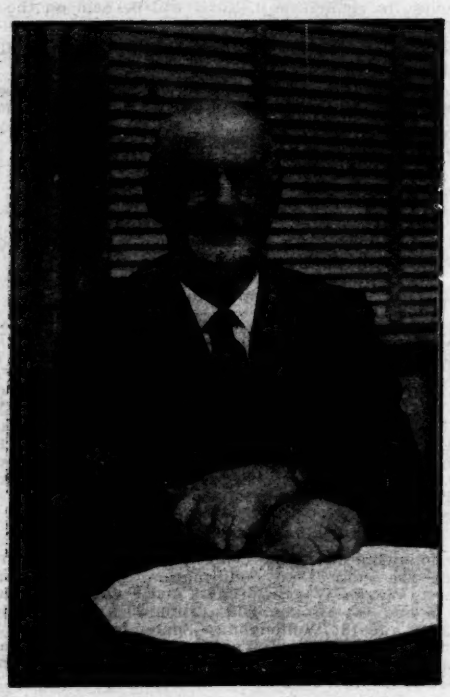
From the personal aspect, he was a man who believed in action and possessed the drive to get things done and to sustain a long effort without deviation or visible fatigue. His purpose was urgent, and his manner was forthright; so that occasionally he trod on a few sensitive toes owing to a love of truth as he saw it and his desire to get something done. He was never content to wait until some nebulous tomorrow; the time to get things done was always "now".

I was his assistant for many years, and during this time he was always available at any hour to discuss a case or to see an unusual clinical problem. His manipulative skill in obstetrics was of an order that is becoming uncommon because he trained in the days when the mortality from Cæsarean section was high, before the era of chemotherapy and antibiotics. It was then imperative, whenever possible, to effect a vaginal delivery instead of cutting Gordian knots with a scalpel through the lower uterine segment. He was always in demand as a consultant because of his skill at unscrambling an obstetric muddle.

Together with many others I was a frequent visitor at his home, and here it was a delight to watch him amongst his family and a privilege to share the enjoyment. The staff of The Women's Hospital owes much to him for his constant effort to keep them working as companions in a team.

During the last decade he decided to "attack" sheep farming. At Murrurundi he studied soil deficiencies and pasture improvement, and incidentally caused some amusement among the local inhabitants by examining the excrement of sheep for parasite eggs with his microscope. In any epidemic all sheep that died had to be subject to an autopsy. It did not take him long to discover that an epidemic said to be due to "Sturt's pea" was in reality a new parasitic disease. In his early days on the land he avoided the problem of sterility among sheep by buying only those which already had lambed.

If the measure of a man's fame be the brightness of the torch that he hands on to his successors, then he is indeed already famous. In illness or in health, in poverty or in wealth, he was a friend as well as a doctor to a multitude



of people who will always miss his presence and his personality. Whenever he undertook a task he at once became the "spark plug" of the enterprise, dynamic and energetic.

He leaves a wife, two sons and a daughter. One son is a doctor and studying surgery in London at present, and the younger one is in business. His daughter is training as a nurse at the Royal Alexandra Hospital for Children. Our sympathy is extended to them all.

DR. JOHN CHESTERMAN writes: With the death of Thomas Dixon Hughes, the medical profession has lost a colourful personality. His worth as a doctor was recognized early, for at Sydney Hospital in 1923 he was selected as a senior resident medical officer in preference to many with longer terms as juniors. Following this, a year as resident medical officer at The Women's Hospital (Crown Street) started his interest in obstetrics and gynæcology.

One might say that at this time the hospital was just emerging from its adolescence. It needed the energy and fresh ideas that a junior honorary medical officer such as Tommy Hughes supplied. My own close and long association with him began at this time, so I can speak with certainty of the interest and enthusiasm and devotion he put into this hospital.

His crowning achievement grew from his idea that eclampsia could be prevented. To persuade—I could almost say brow-beat—a large organization into relentlessly following a plan of action speaks for Dixon Hughes's personality. As is well known, he proved his point, and shortly after his death a letter was received from the British Ministry of Health, asking for the details of this campaign against eclampsia.

Tommy had strong convictions and the moral courage to support them. Should an argument become heated, those who heard him could appreciate the truth of Shakespeare's words: "Violent fires soon burn out themselves." His sense of humour would always take charge.

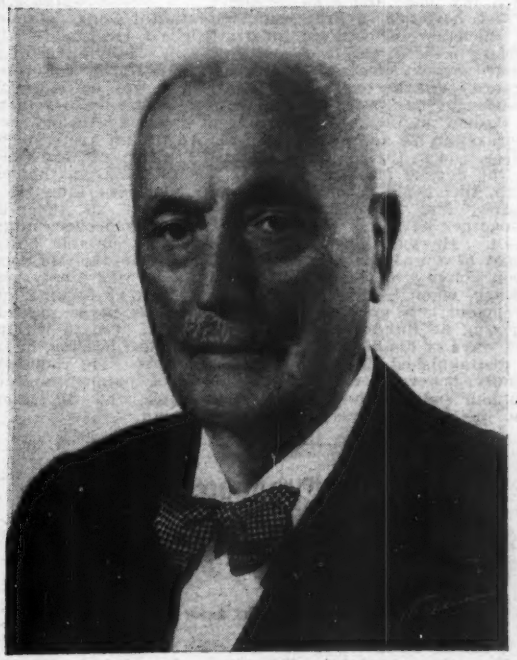
Some of his great success as a doctor was due to his ever-ready response to distress, and perhaps his best epitaph was said to me by one of his old patients with tears in her eyes: "He was a truly kind man."

WILLIAM L'ESTRANGE EAMES.

DR. A. M. MCINTOSH has prepared the following appreciation of the late Major-General William L'Estrange Eames.

Major-General Eames, who died recently in his ninety-fourth year, was the last survivor of the medical officers who served in the Boer War with the New South Wales Army Medical Corps.

William Eames was born in Poona in 1863. His father, an intimate friend of the brilliant officer who later became Field Marshal Lord Roberts, was a chaplain attached to one of the regiments maintained by the East India Company.



He was still a small boy when he was taken to England, crossing by train from Suez to the Mediterranean at a time when the Suez Canal was under construction. He always maintained that he remembered seeing the work in progress. He went to school in Oswestry and later proceeded to Cambridge with the intention of following a family tradition and entering the Church. Here he became an enthusiastic oarsman and "got his blue", and he maintained a keen interest in rowing till the end of his life. The death of his mother necessitated a change in his plans, and he became a medical student at Trinity College, Dublin, where he was much in demand as a rowing coach. In 1885, while he was still an undergraduate, the Soudan War broke out. D. J. Cunningham, who was Professor of Anatomy at Trinity College, raised a medical unit, in which Eames enlisted. The unit was equipped, but the war ended before it embarked. In 1886 he graduated B.A., B.Ch., B.A.O., and in August of the following year he arrived in Sydney. He proceeded at once to Newcastle, where he was associated in practice with the late Dr. J. L. Beeston. He remained in Newcastle until 1914, busily occupied in a general practice, which was largely

concerned with shipping at a time when the port was usually full of vessels, steam and sail, awaiting cargoes of coal. His civilian practice was interrupted in 1900 by the Boer War. In the early nineties Eames had joined the Medical Staff Corps, as it was then called, and regularly attended schools of instruction and exercises arranged by the Principal Medical Officer, Colonel W. D. C. Williams. When the New South Wales Government's offer of mounted units was accepted, Eames was an early volunteer and left Sydney in January, 1900, with the rank of major in the Second Contingent, which also included amongst other medical officers Alexander MacCormick, Robert Scot Skirving and Neville Howse. The units of the New South Wales Corps were well trained and equipped and highly mobile. They did their full share of duty in the Transvaal and the Orange Free State, both in action and in caring for the numerous patients suffering from enteric fever. Eames was taken prisoner by the Boers, but he persuaded his captors to let him go. His services were recognized by the award of the order of Companion of the Bath. In 1901 he returned to Newcastle and continued his practice there until 1914, when he went to England for a holiday. He was in London when war broke out and was appointed Commanding Officer of the Australian Voluntary Hospital with the rank of colonel. This hospital was endowed by Australians resident in England. It was staffed throughout the war by Australian medical officers and nurses; the orderlies were supplied by the Royal Army Medical Corps. It functioned at Wimereux, except for a short period when enemy pressure necessitated a retirement to St. Nazaire. The hospital was very well equipped; it had an X ray plant and a motor ambulance service before other British hospitals in France and maintained a high standard of efficiency in both administration and treatment. The officers' mess in the local golf club was a rallying point for many medical officers of the Australian Imperial Force in France. At the end of the war Eames was made a Commander of the Order of the British Empire. He returned to Sydney in 1919 and retired from practice. He did, however, retain his association with the Australian Army Medical Corps, and in 1920 he was appointed Principal Medical Officer of the Second Military District. He retired from this post with the rank of major-general. Business interests in Sydney and Newcastle occupied much of his time, and altogether he had a very full life and enjoyed every minute of it. He was most indignant when no suitable posting could be found for him during World War II. He was a keen golfer and played regularly until he was ninety years of age, when he took up bowls, at which he became quite proficient. A good judge of a horse, he never missed a meeting at Randwick or Warwick Farm, even to within a few days of his death. Tall and of dignified bearing, he was a distinguished figure in any assemblage. He radiated a kindly benevolence, and his charm of manner and dry humour endeared him to all his associates, who will treasure the memory of a very gallant gentleman.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

PROGRAMME OF COURSES FOR 1957.

THE Post-Graduate Committee in Medicine in the University of Sydney announces the following programme of courses for 1957.

Metropolitan Courses.

A course in neurology will be held on the week-end of March 16 and 17.

A course in ophthalmology in its relation to general practice and industry will be held for one week from March 18 to 22.

A course in electrocardiography will be held on the week-end of March 23 and 24 at Sydney Hospital.

A course in radiological diagnosis and techniques will be held on the week-end of April 13 and 14.

A revision course in the basic medical sciences will be held from April 8 to July 12.

A general revision course will be held for two weeks full time from May 6 to 17. The theme of the course will be therapeutics.

A course in gastro-intestinal diseases will be held on the week-end of June 22 and 23 at the Royal Prince Alfred Hospital.

A revision course will be held at the Rachel Forster Hospital. Information will not be available until early next year on the dates of this course, which was held in 1956 in July.

A course in pædiatrics will be held at the Royal Alexandra Hospital for Children on the week-end of August 3 and 4.

A course in obstetrics and gynæcology will be held full time for one week from September 2 to 6 at The Women's Hospital, Crown Street. Professor R. J. Kellar, of Edinburgh, will be guest lecturer at this course.

A course in chest diseases will be held on the week-end of September 7 and 8.

A course in rheumatic diseases will be held on the week-end of October 12 and 13.

A course in occupational medicine will be held for one week from October 21 to 25.

A course in dermatology will be held on two consecutive week-ends, November 9 and 10 and November 16 and 17.

A course in psychosomatic medicine will be held on the week-end of November 23 and 24.

Consideration is being given to holding the courses in the following additional subjects in the metropolitan area: radio-isotopes, mental deficiency, hæmatology and geriatrics, the latter to coincide with the probable visit to Sydney in the latter half of 1957 of Sir Geoffrey King, late Under-Secretary to the Ministry of Pensions, United Kingdom.

Diploma Courses.

The following diploma courses will be held. January 14: M.R.A.C.P. (eleven weeks). March 18: D.D.R. Part I (four months); D.T.R. Part I (four months). D.P.M. Part I (eight months) (date to be decided later). April 8: Primary F.R.A.C.S. (twenty weeks). May 13: D.D.M. Part I (twelve weeks). June 3: M.R.A.C.P. (eleven weeks). July 15: D.A. Part II (three months); D.C.P. (seven months). July 22: D.P.M. Part II (eight months). August 12: D.D.M. Part II (seven months). September 2: D.A. Part I (eleven weeks); D.G.O. Part I (eleven weeks); D.L.O. Part I (eleven weeks); D.O. Part I (eleven weeks).

Country Post-Graduate Conferences.

The following dates and centres for country post-graduate courses are subject to confirmation. April 27 and 28: Bathurst, Wagga Wagga. June 8 and 9: Armidale, Hornsby. June 15 and 16: Broken Hill. June 29 and 30: Katoomba. July 2, 10 and 18: Wollongong. September 7 and 8: Albury. September 14 and 15: Coff's Harbour. October 19 and 20: Parramatta. October 26 and 27: Newcastle. November 16 and 17: Bega and Cooma.

Clinical Meetings at Balmoral Naval Hospital.

Clinical meetings open to medical practitioners will be held at the Balmoral Naval Hospital on the following Tuesdays in 1957, beginning at 2.15 p.m., with a lecture on a selected topic: February 12, March 12, April 9, May 14, June 11, August 13, September 10, October 8, November 12, December 10.

Other Training Facilities.

Other training facilities available to practitioners are as follows:

Anæsthesia. Post-graduate residence has been available for practical training in modern methods of anæsthesia at The Royal Newcastle Hospital for one week of five days. Owing to advance reservations, no vacancies will be available before February, 1958.

Blood grouping and transfusion. Instruction in the technique of blood grouping and transfusion is available free of charge at the Red Cross Blood Transfusion Service or at The Royal Newcastle Hospital.

Gynæcology and obstetrics. Post-graduate residence is available in gynæcology and obstetrics at The Women's Hospital, Crown Street, and at the Royal Hospital for Women, Paddington.

General residencies. Post-graduate residence will be available for women graduates at the Rachel Forster Hospital for Women and Children, Redfern, and for men graduates at the Mater Misericordiæ Hospital, North Sydney, during 1957. Further details will be announced later.

External studies. Arrangements can be made to meet the individual needs of medical practitioners requiring *à la carte* courses.

Forensic post-mortem examinations. Instruction is available free of charge in the technique of the performance of forensic post-mortem examinations.

Annual Subscription Course.

The annual subscription course covers attendance at lectures by overseas lecturers and other specially arranged activities. A diary card is printed at regular intervals and is distributed to all members. The annual fee from July 1 is £2 2s. The fee for resident medical officers is £1 1s.

Arrangements are being made for the following lecturers to visit Sydney during 1957 and to lecture in the annual subscription course: Professor Lambert Rogers, Surgical Unit, Royal Infirmary, Cardiff (February 3 to 10); Dr. L. Guttmann, Director, Spinal Unit, Stoke Mandeville (March 3 to 17); Dr. Merrill Sosman, Radiologist, Peter Bent Brigham Hospital, Boston (March 15 to 20); Professor A. Ashley Weech, Professor of Pædiatrics, Cincinnati (March 26 to April 16); Dr. S. Whately Davidson, President, Faculty of Radiologists and Physician-in-Charge, Radiological Department, Royal Victoria Infirmary, Newcastle-on-Tyne (May), and Dr. John F. Bromley, Director, Radiotherapy Department, Birmingham United Hospitals, and Consultant in Radiology, Royal Air Force (May) (both will be visiting Sydney as examiners of the Faculty of Radiologists of London); Mr. C. P. Wilson, Senior Ear, Nose and Throat Surgeon, Middlesex Hospital, and Director of the Ferens Institute of Pathology (June 10 to 17); Mr. A. Dickson Wright, Surgeon to St. Mary's Hospital and Prince of Wales Hospital, London (August-September); Dr. Daniel G Morton, Professor of Obstetrics and Gynæcology, University of California (early August); Professor R. J. Kellar, Professor of Obstetrics and Gynæcology, University of Edinburgh (August 23 to September 7) (Professor Kellar is the official post-graduate lecturer for 1957); Commander James L. McCartney, Psychiatrist, of New York (September-October); Sir Russell Brock, Surgeon to Guy's and Brompton Hospitals, London, and Guest Surgeon to Saint Vincent's Hospital, Sydney (October); Dr. Owen H. Wangensteen, of the Department of Surgery, University of Minnesota, Minneapolis (possibly December).

Method of Enrolment.

In all cases application for enrolment in post-graduate courses should be made to the Course Secretary, The Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney, from whom further particulars may be obtained. Telephones: BU 4497-8. Telegraphic address: "Postgrad Sydney."

Research.

THE WILLIAM GIBSON RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN.

APPLICATIONS are invited for the William Gibson Research Scholarship for Medical Women from women who are British subjects and who hold a registrable medical qualification. The Scholarship, which is normally awarded for two years, but which may be extended for a third year, is for £200 *per annum*. In choosing the Scholar, the Council of the Society will be guided by the research work already done or contemplated by candidates. It is expected that a candidate will hold a recognized appointment, and that the Scholarship will be a useful aid to research either in the United Kingdom or abroad.

There is no examination, nor need a thesis be prepared for publication; but the Council expects that an annual report will be submitted to it from the Scholar on work made possible by the award, and that due recognition of the award will be given in any papers subsequently published.

The next award will date from October 1, 1957, and applications must be received by the Society by May 31, 1957. They should give details of professional training received, appointments held, and research work undertaken or contemplated. The names of two referees should be given. Applications should be addressed to the Secretary, Royal Society of Medicine, 1 Wimpole Street, London, W.1.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED NOVEMBER 24, 1956.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	2(1)	5(3)	5(3)	..	..	..	1	..	13
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	2	..	3	..	..	..	..	..	5
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	..	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	2(1)	..	..	..	..	..	..	2
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	4(2)	16(15)	4(4)	..	..	1	..	..	25
Diphtheria	..	..	..	..	4(4)	..	..	..	4
Dysentery (Bacillary)	..	2(2)	104(4)	..	2(1)	..	1	..	109
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	108(56)	56(18)	..	17(4)	2(1)	1(1)	2	..	186
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	1	..	..	..	..	..	1
Leptospirosis	..	..	3	..	..	..	..	..	3
Malaria	..	1(1)	..	..	..	..	..	..	1
Meningococcal Infection	..	4(3)	..	..	..	..	..	..	4
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	2(1)	..	2(2)	..	..	..	..	4
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	55(30)	3(3)	71(55)	7(3)	..	..	..	136
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	10(6)	15(12)	4(4)	5(3)	2(2)	..	..	..	36
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1	..	..	..	..	..	1
Trachoma	..	..	..	..	1	..	..	..	1
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	32(14)	14(2)	9(7)	6(5)	23(4)	4(2)	1	..	89
Typhoid Fever	..	..	..	..	1	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Congresses.

INTERNATIONAL CONFERENCE ON AUDIOLOGY.

AN International Conference on Audiology will be held in St. Louis, Missouri, from May 13 to 16, 1957, in connexion with the sixth International Congress of Otolaryngology which is to be held in Washington, D.C., from May 5 to 10, 1957. The themes to be discussed are the assessment of auditory function, the physiology of audition and the relation of hearing loss to noise exposure. Persons desiring to contribute papers should submit an abstract to the programme chairman not later than March 1, 1957. Further information may be obtained from Dr. S. R. Silverman, Central Institute for the Deaf, 818 South Kingshighway, St. Louis 10, Missouri, United States of America.

Australian Medical Board Proceedings.

TASMANIA.

THE following have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners: Endelmanis, Arvids A., M.D. (Univ. Hamburg), 1946; Jerums, Juris E., M.D. (Univ. Riga), 1931; Matysek, Charles, M.D. (Univ. Prague), 1943; Shuley, Karoly D. N., M.D. (Univ. Budapest), 1940.

The following have been granted special licences to practise for the ensuing twelve months under Section 15 of the *Medical Act*, 1918, of Tasmania: Skrastins, Arturs, M.D. (Univ. Riga), 1931; Will, Heinrich, M.D. (Univ. Berlin), 1950.

The following have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners: Mackie, John Beveridge, M.B., Ch.B. (Univ. Edinburgh), 1932; Dickinson, James Malcolm, M.B., Ch.B. (Univ. Sheffield), 1947.

The following additional diplomas were registered: McArthur, Andrew McShee, M.C.P.A., 1956; Bloomfield, John Anthony, M.C.R.A., 1956; Woodley, John, F.F.A.R.C.S. (England), 1955, F.F.A.R.A.C.S., 1956.

Medical Appointments.

Dr. H. C. Evans has been appointed Quarantine Officer, Port Kembla, New South Wales, pursuant to the provisions of the *Quarantine Act*, 1908-1950.

Dr. G. Buchanan has been appointed Quarantine Officer, Bundaberg, Queensland, pursuant to the provisions of the *Quarantine Act*, 1908-1950.

Dr. B. B. Turner has been appointed to the Division of Mental Hygiene in the Department of Public Health for New South Wales.

Dr. J. R. Healy has been appointed government medical officer at Cooktown, Queensland.

Dr. James Duffy has been appointed government medical officer at Redcliffe, Queensland.

Dr. John Davenport has been appointed senior medical registrar at the Royal Adelaide Hospital, South Australia.

Dr. Helen Mary Phillipps has been appointed a member of the State Children's Council of the Northern Territory, pursuant to the provisions of the *State Children Acts*, 1895 to 1909, of South Australia, as amended in its application to the Northern Territory.

Dr. G. D. Mullholland has been appointed a medical officer in the Mental Hygiene Branch of the Department of Health, Victoria.

Dr. James Roland Lawrence has been appointed medical registrar at the Royal Adelaide Hospital.

Dr. Eric Cunningham Dax has been appointed a member and chairman, Dr. C. R. D. Brothers has been appointed a member and deputy chairman, and Dr. E. R. H. Ebbs has been appointed a member of the Mental Hygiene Authority of Victoria, pursuant to the provisions of Section 4 of the *Mental Hygiene Act*, 1950.

Dr. Robert Hecker has been appointed an honorary assistant visiting officer at the Royal Adelaide Hospital.

Dr. John Hudson Begg has been appointed an honorary clinical assistant at the Royal Adelaide Hospital.

Deaths.

THE following deaths have been announced:

FORSHAW.—William Anthony Forshaw, on November 27, 1956, at Melbourne.

BURFITT.—Mary Boyd Williams Burfitt, on November 30, 1956, at Sydney.

MATTHEWS.—Henry Delahunt Matthews, on December 2, 1956, at Sydney.

PARR.—Leslie James Albert Parr, on December 3, 1956, at Sydney.

Diary for the Month.

DEC. 13.—New South Wales Branch, B.M.A.: Ethics Committee.
DEC. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.

1957:
JAN. 7.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JAN. 8.—New South Wales Branch, B.M.A.: Council Quarterly.
JAN. 11.—Queensland Branch, B.M.A.: Council Meeting.
JAN. 14.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognise any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 *per annum* within Australia and the British Commonwealth of Nations, and £6 *per annum* within America and foreign countries, payable in advance.